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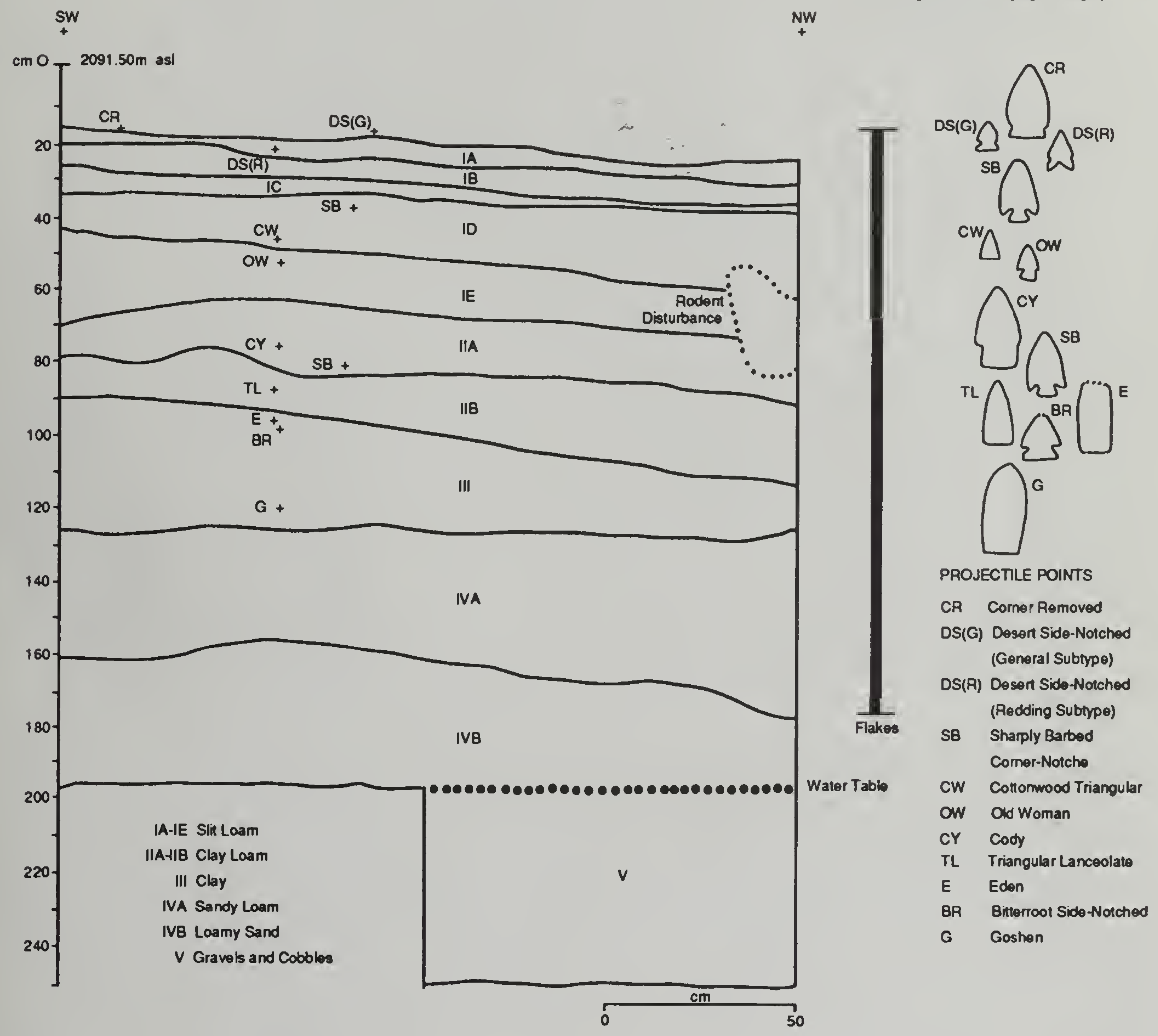
An Archeological Overview of Butte District Prehistory

By
Sherri Deaver and
Ken Deaver



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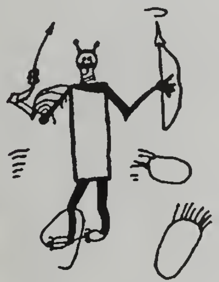

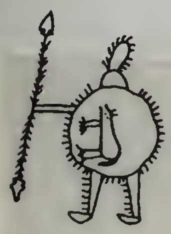

No. 2

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

BUREAU OF
LAND MANAGEMENT
MONTANA STATE OFFICE

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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Special thanks are given to the Department of Sociology at Montana State University which allowed the editor to use equipment, space, and materials on this project while she was teaching in the Department.

John Taylor, Butte District Archeologist, gets special recognition for his compilation of site and survey data and his willingness to share the as yet unpublished results of his personal professional research.

Terri Wolfgram typed the vast majority of this report. We appreciate her perseverance under less than ideal conditions.

Foreward

This volume represents the second in a series of cultural resource management monographs published by the Montana State Office of the Bureau of Land Management. The purpose of this series is to provide researchers and investigators with a set of generally unreferenced and limited distribution documents produced by the BLM or funded by BLM on the cultural resources under its jurisdiction.

The BLM is required by the National Historic Preservation Act to take into account potential effects to cultural resources caused by a Bureau approved or licensed activity. In order for the BLM to consider these effects, we must know the nature of the resources under consideration, and we must know how to determine their significance within an identified context. The purpose of this Class I was, therefore, structured to provide the BLM with sufficient information to make rational decisions regarding the management and treatment of specific resources.

The research for this monograph took place between July 1983 and July 1984. The focus of the synthesis was guided by federal contract specifications and by the theoretical orientation of the investigators. It is successful primarily because it effectively summarizes, for this area, the present state of prehistoric information and research, the history of archeological investigation, the ethnographic data base, and the pertinent bibliographic references on the prehistory of western Montana.

Gary P. Smith
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July 1990

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AN ARCHEOLOGICAL OVERVIEW OF BUTTE DISTRICT PREHISTORY

Bureau of Land Management
Montana

by

Sherri Deaver and Ken Deaver

Volume Editor:
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Montana State University

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Abstract

Ethnoscience was contracted by the BLM (Co. No. YA551-CT3-340103) to conduct a Class I Overview of the prehistoric cultural resources of the Butte District, western Montana. Class I Inventories provide cultural resource managers with overviews of the resources they manage and provide frameworks for evaluating said resources. The evaluation and management of cultural resources on lands under the stewardship of the BLM is a legislatively mandated responsibility of the Bureau.

Ethnoscience reviewed site file data, lithic material collections, ethnographic and ethnohistoric literature, and environmental literature, in addition to archeological literature, in preparing this inventory.

Review of the current data base indicates that the District is characterized by environmental diversity. Two areas have significance for culture history: the transmontane and the plains/grasslands environments. The former is characterized by high faunal and flora species diversity, but low density of any particular species; human adaptations are characterized by flexibility, stability, and low population density. The latter is characterized by fewer species, but higher density of particular species; human adaptations are characterized by relative specialization in hunting and fluctuations in population size and density which can be correlated with episodic climatic change.

Review of the archeological history of the District indicates that those who work mainly in the transmontane areas of the District tend to emphasize in situ development of cultural adaptations. Researchers working primarily in the plains/grasslands areas of the District tend to emphasize "outside influences" in the developmental history of the area.

Butte District Archeology
A Class I Inventory of Prehistoric Resources

Sherri Deaver, Editor

A Report in Fulfillment of Contract No. YA551-CT3-340103,
Butte District, Bureau of Land Management

Ethnoscience
702 Orilla
Billings, Montana 59105

July 1984

TABLE OF CONTENTS

PART I. THEORETICAL BACKGROUND (S. Deaver)

1.1 Parameters of the Project 1
1.2 Areal Parameters 1
1.3 Methodological Parameters 4
  1.3.1 Records and Collections From Sites on BLM Land 4
  1.3.2 Review of the Ethnographic Record 5
  1.3.3 Review of the Archeological Literature 5
1.4 Theoretical Parameters 6
1.5 Prehistory of the Butte District 7
  1.5.1 Spatial Concepts 7
  1.5.2 Temporal Concepts 8

PART II. ENVIRONMENTAL BACKGROUND (K. Deaver)

2.1 Physical Environment 13
  2.1.1 Nature of the Terrain 13
  2.1.2 Geology 13
  2.1.3 Climate 17
2.2 Biotic Environment 18
  2.2.1 Vegetation 18
  2.2.2 Fauna 19
2.3 Paleo-Environments 23
2.4 Significant Resources for Prehistoric Groups 26
  2.4.1 Lithics 26
  2.4.2 Plant Foods 28
  2.4.3 Game Resources 31
  2.4.4 Summary of Resources 33

PART III. CULTURAL BACKGROUND: THE ETHNOGRAPHIC DATA BASE (S. Deaver)

3.1 Sources and Limitations of the Data Base 35
3.2 Uses of the Ethnographic Data Base 35
  3.2.1 Continuous Vs. Discontinuous Analogies 36
  3.2.2 Analogues: Source of Explanation or Source of Hypothesis 36
  3.2.3 The Contrastive Approach 37
3.3 The Ethnographic Data Base and Site Formation Processes 37
  3.3.1 Tools 37
  3.3.2 Tools: Archeological Implications 41
  3.3.3 Housing Patterns and Their Archeological Implications 43
  3.3.4 Subsistence Activities and Their Archeological Implications 46
3.4 Summary 47

PART IV. ARCHEOLOGICAL HISTORY OF THE BUTTE DISTRICT (S. Deaver)

4.1 Introduction 49
4.2 The Speculative Period (1492-1840) 49
4.3 The Classificatory-Descriptive Period (1840-1914) 49
4.4 The Classificatory-Historical Period (1914-1940) 50
4.5 The Classificatory-Historical Period: The Concern With Context and Function (1940-1960) 51
4.6 The Explanatory Period (1960-) 54
  4.6.1 Descriptive Accounts in the Explanatory Period 56
  4.6.2 Analytical Studies of Prehistoric Technologies in the Explanatory Period 57
  4.6.3 Systematic Survey in the District During the Explanatory Period 57
  4.6.4 Major Excavations During the Explanatory Period 60

4.6.5 Ecological Models and Settlement Systems Proposed During the Explanatory Period 61
4.6.6 Contrasting Paradigms Used in the Explanatory Period 62
4.7 Summary of Historical Trends in District Archeology 67

PART V. NATURE AND DISTRIBUTION OF SITES ON BLM LANDS IN THE BUTTE DISTRICT (K. Deaver)

5.1 Available Data 69
5.1.1 Sites on BLM Lands 69
5.1.2 Extent of Survey 70
5.1.3 Diagnostics Reviewed 70
5.1.4 Radiocarbon Dates 70
5.2 Areal Site Distribution 71
5.2.1 Site Types and Attributes 71
5.2.2 Site Density and Size 74
5.3 Environmental Site Distribution 76
5.3.1 Site Types and Attributes in Landforms 76
5.3.2 Site Size in Landforms 76
5.3.3 Features and Site Size By Elevation 76
5.4 Temporal Site Distribution 78
5.4.1 Diagnostics Reported and Reviewed 78
5.4.2 Lithic Materials of Reviewed Diagnostics 80
5.4.3 Radiocarbon Dates 81
5.4.4 Summary and Speculations 82

PART VI. SYNTHESIS (S. Deaver)

6.1 Introduction 85
6.2 District Prehistory 85
6.3 Butte District Cultural Resources 87
6.3.1 Archeological Sensitivity 87
6.3.2 Management Indices 88
6.4 Recommendations For Future Work 90
6.4.1 Methodological Concerns 90
6.4.2 Foci of Future Work 91

REFERENCES CITED 93

APPENDICES

Appendix I. Sites in the Butte District 107
Appendix II. Diagnostics From Sites 123
Appendix III. Annotated Bibliography of Sources Reviewed 137
Appendix IV. Selected Point Style Illustrations 175

List of Tables

Table 1. Phase/Period and Associated Projectile Points 12
Table 2. Mammalian Taxa Native to the Butte District 20
Table 3. Wild Plant Foods Native to the Butte District 29
Table 4. Sizes of Longlodges and Conical Mat/Brush/Bark Timber Lodges 45
Table 5. Site Types By Counties 72
Table 6. Site and Feature Types By Resource Areas 72
Table 7. Site Densities in Counties and Resource Areas 75
Table 8. Mean Site Size 75
Table 9. Site Types By Landforms 77
Table 10. Total Features By Landforms 77
Table 11. Site Size By Landforms 77
Table 12. Total Features and Mean Site Size at Different Elevations 77
Table 13. Affiliations of Points and Ceramics Reported on Site Forms 79
Table 14. Affiliations of Reviewed Projectile Points and Ceramics 79
Table 15. Material Types of Reviewed Diagnostics 81
Table 16. Radiocarbon Dates From the Butte District 82

List of Figures

Figure 1. Original and Subsequent Boundaries of the Butte District 2
Figure 2. Distribution of BLM Lands Within the Butte District 3
Figure 3. Culture Area Boundaries Relative to the Butte District 9
Figure 4. Postulated Spatial Units Relative to the Butte District 10
Figure 5. Chronological Schemes Applied to the District 11
Figure 6. Major Rivers and Mountain Ranges of the Butte District 14
Figure 7. Exposed Geologic Strata 15
Figure 8. Past Environments of the Study Area 24
Figure 9. Major Exposures of the Madison Complex in the Butte District 27
Figure 10. Kroeber's Culture Areas 52
Figure 11. Malouf's Montana Western Region 55
Figure 12. Napton's Regions 58
Figure 13. Roll's Barrier Falls Subarea 64
Figure 14. Flint's NRMA 66
Figure 15. Present Resource Areas of the Original Butte District 73
Figure 16. Comparisons of Temporal Data From Three Samples 83

PART I. THEORETICAL BACKGROUND

1.1 Parameters of the Project

The Bureau of Land Management (BLM), as a federal agency, is responsible for evaluating and managing cultural resource properties on lands under their stewardship. This responsibility is mandated by the National Historic Preservation Act of 1966 and the Archeological Resource Protection Act of 1980. In order to fulfill these obligations, the BLM planning system requires that a Class I Inventory be completed for each District. This report constitutes a Class I Inventory of the prehistoric resources of the Butte District in western Montana.

The purposes of a Class I Inventory are: (1) to review and synthesize regional prehistory, (2) to provide an overview of area resources, and (3) to provide a framework from which to evaluate, compare, and understand the cultural properties of an area. The basic strategy for fulfilling these aims involved the review and synthesis of library, archival, and documentary evidence about District prehistory. In this case, the BLM contracted with Ethnoscience to review site files, published and unpublished literature, and artifact collections from sites on BLM land in the Butte District. The following report summarizes this review.

1.2 Areal Parameters

The BLM Butte District is an administrative unit, the boundaries of which were changed while this project was being conducted. (The RFP was issued in 7/1983 and the report was completed on 7/1984). The original and subsequent boundaries of the District are shown in Figure 1. This report covers the larger, original District and, therefore, is relevant to the cultural resource managers of the current BLM Butte and Lewistown Districts. Throughout this report, the "Butte District" refers to the larger, original administrative District.

The Butte District encompasses 585,600 ha (1,444,431 acres) of public land in west-central and southwestern Montana. Figure 2 shows the distribution of BLM lands within the District. The geography of the District is dominated by a series of mountain ranges and intervening valleys. A wide variety of microclimates associated with variations in soil type, vegetational communities, elevation, and annual rates of precipitation create an intricate mosaic of habitats in the District. Many of these habitat types are repetitive. In other words, when similar combinations of soil type, vegetation, elevation, and precipitation occur in scattered isolates, functionally equivalent noncontiguous habitats are created. Since the District lies within the Overthrust Belt, which is characterized by complex folding and faulting of sediments, the geology of the District can also be seen as a complex mosaic. Igneous intrusives as well as folded and faulted limestone formations characterize the surface geology throughout the District. These formations are of particular significance to understanding the archeology of the District since they provide a multiplicity of lithic source areas and materials for prehistoric tool manufacture. The same formations and consequently the same lithic materials outcrop in a wide variety of localities. One consequence of this distribution, which is critical to the archeologist, is that it is extremely difficult to isolate the particular quarry from which specific lithic items originated.

The environmental and geological diversity of the District is paralleled in the archeological record of the District. Current data indicate that the western and south-central montane counties of Montana exhibit the widest diversity of dates of prehistoric occupation of any region in Montana. The District has been occupied throughout prehistory. When the available C-14 dates for the region were examined in comparison with the C-14 dates from other parts of Montana, the mean and median dates are the oldest of all regions, and the high standard deviation indicates a wide range of dates without strong clustering in any one time period. Thus, this region has had established populations since the last glaciation (K. Deaver 1983a I:4-34 to 4-35).

The ethnographic record of the region encompassed by the Butte District can also be conceptualized as a mosaic. Plains, Basin, and Plateau groups are known to have inhabited the area in ethnohistoric times. Therefore, if there is one significant factor that defines the District for the purposes of cultural resource management, it is diversity. This diversity is a product of two factors. First, the Butte District is an administrative unit. Its boundaries are based on criteria which have little to do with cultural resource management. It is not surprising then that the District

Figure 1: Original and Subsequent Boundaries of the Butte District

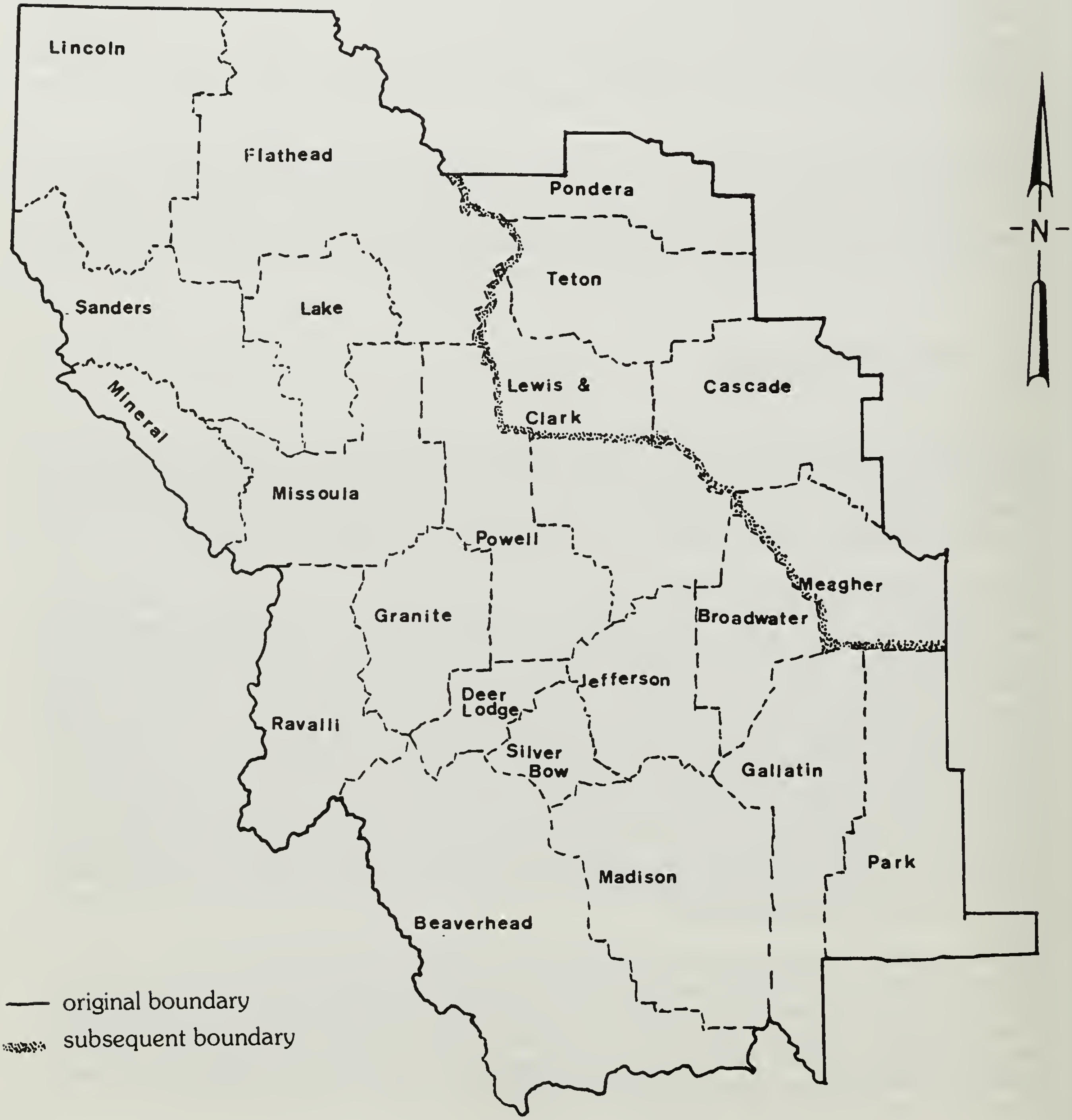
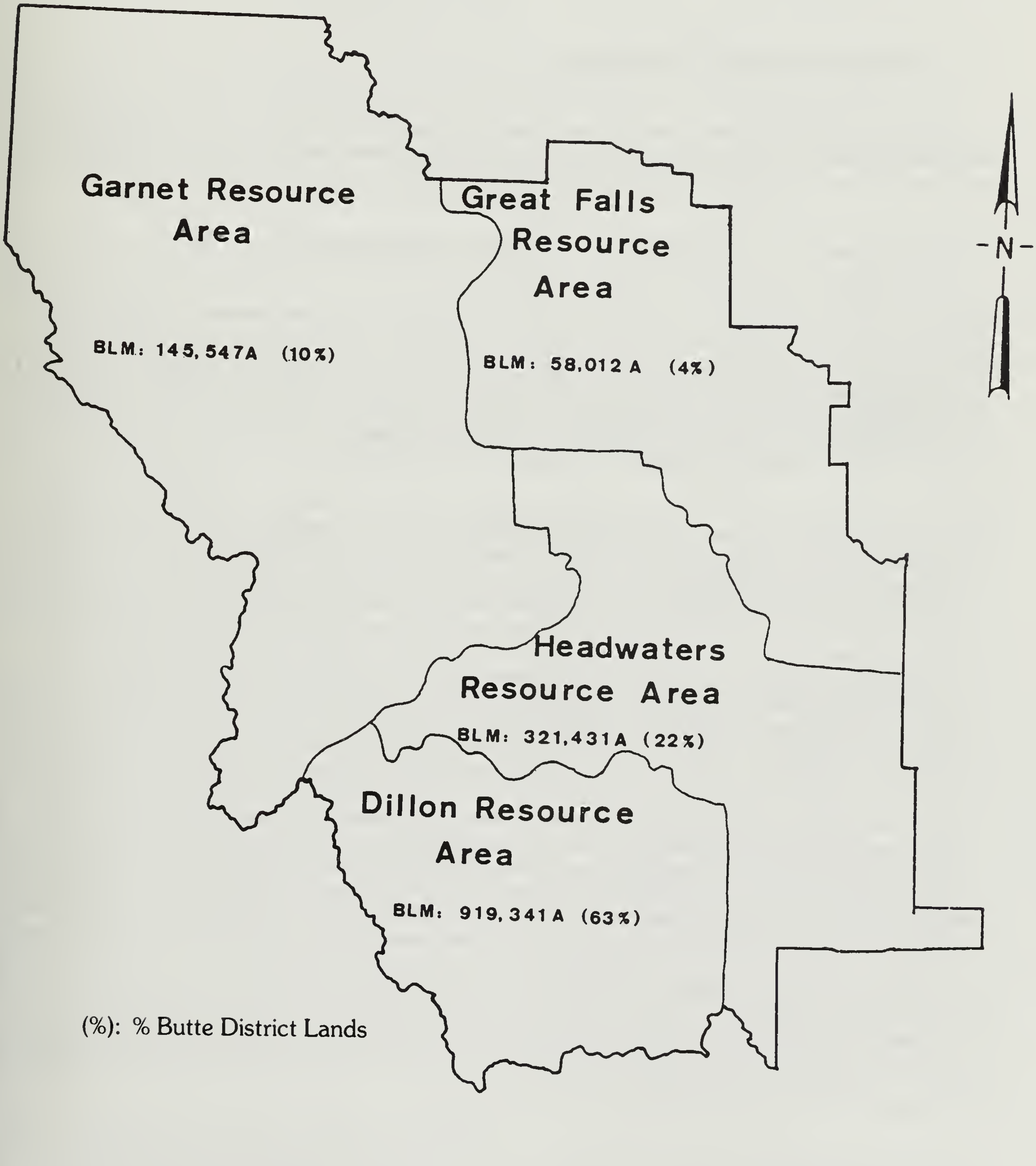


Figure 2: Distribution of BLM Lands Within the Butte District



encompasses a variety of archeological/cultural manifestations. The second source of diversity is intrinsic to the environment of the area. The mountainous topography structures a situation of ecological diversity, which in turn creates a resource base characterized by high resource diversity but low resource density. In turn, this resource diversity allows for variety in prehistoric subsistence strategies.

1.3 Methodological Parameters

We reviewed three data bases for this project: the archeological literature, the ethnographic record, and the BLM and University of Montana site records (including collections). Because these data bases have inherent limitations, and required special approaches, they are each discussed separately.

1.3.1 Records and Collections From Sites on BLM Land

Appendices I and II are compilations of data from BLM site records and collections. Both are tabulations for 793 sites, which include the following categories: site type, site area, landform, elevation, site contents (lithics, features, and so on), and diagnostics (by phase). We collected these data by reviewing the site and report files in the Butte BLM office, the State files in Missoula, the site files at Montana State University, and artifact collections housed at MSU, UM, and at the Butte BLM office. No one repository houses all of the site files for sites on BLM land within the District, nor does one repository house all collections from Butte BLM District sites. Obviously, the centralization of these data would facilitate future research efforts in this area.

While the data base generated by this review yielded a larger sample (793 sites) than we had anticipated, it proved to be extremely limited in its usefulness. Before beginning actual data compilation, we had assumed that the following problems would be encountered: (1) site type designations would vary with the recorder, (2) minimal site definitions would vary with recorder, and (3) the site forms would be of varying quality in general, e.g., particular forms would not include the number and type of features, density of lithics, material type of lithics, and so on. We originally proposed to cross tabulate the site data by the following ecological variables: ecozone/landform, immediate topographic setting, vegetation type, elevation, soil type, major geological strata, distance from permanent and seasonal water, and visibility (ability to see 1000 m in how many directions). The only categories we were able to retain were ecozone/landform and elevation. In other words, only two of the original nine factors were tabulated. The others were simply not recorded in systematic fashion on the rare occasions when they were recorded at all. Furthermore, minimal site definitions varied widely. We eventually decided to include in our tabulations all sites that had been (or will be) assigned a Smithsonian number since land managers must make decisions concerning these properties. The reader should note, however, that some of these sites are "one-flake specials." We could not document how many of the sites might be more acceptably classed as isolated finds since the site forms often do not indicate how many items were observed. We imposed our own site types on the basis of site contents and avoided many functional site types, e.g., campsite and occupation, where specific features such as stone rings, bone beds, and so on were not documented. This was necessary since it was rarely indicated on the site forms why a recorder chose to classify a lithic scatter as a campsite, and so on (see Part V for a more detailed discussion of site types). Furthermore, it was necessary simply to ensure comparability of the assembled data set.

We examined collections available from Butte District sites. Ken Deaver and Steve Aaberg typed the points by phase and ignored the designations, if any, given by previous researchers so as to ensure comparability of this data set. Those results are discussed in Part V of this report. The Plains phase names were used only because our typologists were most familiar with them. Our use of these terms should in no way be construed to mean "influence from" or "contact with" the Plains. This may, in fact, in some cases, be true, but that must be tested on the basis of data independent of the projectile points, not just simply assumed.

We had intended to analyze other formal tool classes from the BLM sites in the District, as well as to analyze any significant debitage samples. Neither proved feasible. First, the sample of finished patterned tools that are not projectile points was too small to be representative. Debitage, by and large, was not collected except in the context of major excavations. The only sites (on BLM land) for which a systematic sample of debitage exists are the South

Everson chert quarry site and the Pilgrim site, both of which were reported (Davis 1981; Davis et al. 1982). Thus, our examination of collections was functionally limited to the re-analysis of projectile points.

1.3.2 Review of the Ethnographic Record

We reviewed ethnographic accounts for the following groups: Kutenai, Kalispell, Spokane, Coeur D'Alene, Palus, Cayuse, Nez Perce, Flathead, Blackfoot, Crow, and Shoshone-Bannack, as well as general ethnographic sources about the Basin, Plateau, and Plains culture areas. About halfway through the review process, we added the Thompson, Lillooet, and the Sanpoil-Nespelem. The Thompson and Lillooet were included because Teit, in describing the Interior Salish, constantly skimmed over areas of material culture, saying "x" group makes points, houses, and so on, just like the Thompson and/or Lillooet. The Sanpoil-Nespelem were added for a similar reason. Also, Ray, in discussing Plateau cultures, made constant elliptical references to these groups.

Our review of the ethnographic literature centered on two areas: material culture and subsistence activities. The material about any given group was spotty and often widely dispersed in rather scarce publications. As a consequence, we have included as much detail as possible in the text of this report so that it may suffice and serve as a first-hand review of the widely scattered materials.

There is one major known gap in the ethnographic review, Claude Schaeffer's unpublished field notes on the Kutenai. These documents are available at the Alberta-Glenbow Institute in Calgary and the American Museum of Natural History in Chicago. The scope of work for this project did not provide for visiting these repositories. This was particularly unfortunate because Schaeffer was very much interested in material culture. Thus, we suspect that the eight volumes of data we were unable to review may contain significant information relevant to the archeology of the District.

We highly recommend the Garland volumes on Indian Land Claim cases as a basic resource tool for ethnographic data relevant to the archeologist. Since these volumes were compiled as a by-product for legal testimony to establish land claims, the various articles contain detailed summaries of both early ethnographic and historic sources. Furthermore, they tend to concentrate on subsistence activities, specific localities used, and material culture items, all of which are directly relevant to the archeologist.

The approach taken to the ethnographic data in this report is somewhat unusual. We use the ethnographic data base to formulate hypotheses. Traditionally, the ethnographic record has been used as a source of data to verify interpretations. We reject the latter approach because it assumes continuity in behavior patterns between the Pre- and Post-horse periods and because the ethnographic record, like most other modes of discourse, is sufficiently variable that it can be quoted as evidence of almost anything.

Limitations inherent in the ethnographic data base are manifold. First, many groups have been only sketchily recorded. Second, ethnographers exhibit varying degrees of interest in areas of material culture and subsistence activities, so much so that some topics for some groups are poorly covered, if at all. To our surprise, we found more useful accounts of material culture items than of subsistence activities. The latter were generally described only in an idealized fashion with little or no quantitative measures included. The ethnohistorical literature was even less useful in terms of subsistence activities. The various traveler, explorer, and missionary journals relevant to the District deal with subsistence activities generally only in an incident-specific fashion. No information was given about whether or not the described incident was unusual or representative of normal subsistence effort.

Rarely were any quantitative measures provided. The ethnographic record is reviewed and analyzed in Part III of this report.

1.3.3 Review of the Archeological Literature

Appendix III is an annotated bibliography of sources reviewed in preparing this report. Major works are summarized in the text, but the reader is referred to Appendix III for a more exhaustive listing of relevant literature. Due to our theoretical biases (cf. Section 1.4), this literature review includes a substantial number of environmental data sources. Further, since the District straddles three culture areas, Basin/Plains/Plateau (Figure 3), we reviewed major theoretical articles/volumes from these three areas.

This data base also has inherent limitations. All intellectual pursuits are bounded by the framework in which they are carried out. Interest and research topics change over time, and this is reflected in the archeological history of the District (cf. Part IV). District archeological research has involved the evolution of two paradigms herein labeled the "Outside Influences" and the "In Situ" paradigms. Workers in one paradigm tend to ignore as irrelevant questions/interpretations of workers using the other paradigm. The "Outside Influences" paradigm tends to emphasize interregional contacts, seeing in projectile point styles, pottery types, and ground stone tools evidence of Basin/Plains/Plateau influences. Workers in the "In Situ" paradigm focus on local adaptation to particularistic environmental constraints. They tend to emphasize the function of particular artifact classes and how these relate to subsistence strategies, relative mobility, and resource procurement strategies of local groups.

1.4 Theoretical Parameters

As stated above, all research efforts are structured by their theoretical underpinnings. This study is no exception. Our theoretical approach is somewhat eclectic, borrowing as it does concepts and perspectives from the ecosystems approach, structuralism, the cultural systems approach of Geertz, ethnoarcheology, and the recently articulated revisionist stance taken by Alice Kehoe (1981).

Our most basic assumption is that human groups have two sources of adaptive flexibility: one is genetic and the other is non-genetic, i.e., cultural. All human groups and their cultures are parts/subsystems of larger ecosystems. The relationship between various parts of an ecosystem is systemic, i.e., change in one subsystem will result in change in other subsystems. Environmental subsystems may be causative factors in culture change, but the reverse is also true. Following Kehoe (1981), our view is that, for too long, American anthropologists and archeologists have viewed hunters and gatherers as essentially passive shoppers in a supermarket labeled "the environment." We instead view hunters and gatherers as actors who manage the resources they exploit. They modify habitats, e.g., by controlled use of fire to increase productivity of camas beds and/or species, such as castrating bison and returning them to the herds. Also, they actively seek to increase their productivity by increasing the efficiency of their harvesting technology, e.g., communal drives, building fish weirs, and so on.

The resource management strategies of hunters and gatherers are part of their equipment for living. They are the cognitive concomitants of their technological activities. Subsistence systems are, then, a combination of resource management strategies and technological activities. Following Geertz (1964), our view of cultural systems, including subsistence systems, is that they have both conservative and innovative aspects. They are both models of reality, i.e., the way the world works, and models for reality, the way the world should work. Thus, any subsistence system carries its own template for change. In the case of hunters and gatherers, we hypothesize that the "should" or "model for" element will be predicated on the desire to increase the reliability and/or predictability of obtaining particular resources. Thus, change in a hunting and gathering subsistence system will reflect a population's efforts to increase its resource stability.

From structuralism we derive our notion of the cognitive environment. Humans not only live in an environment, they also define, label, and classify it. For example, not all potential food sources are utilized by any human group, but rather certain subsets of resources are defined as good/acceptable/edible. Cognitive concepts such as "crowded," "empty," "barren," and "sacred" space are also an important part of definitions of living area. The way humans conceptualize their environment often affects/reflects how they use it. For instance, the Flathead name for Missoula is "bull trout." Lolo Pass in Flathead is *tumsumeli*, which translates as "no salmon" (Weisel 1952).

This structuralist perspective in our theoretical outlook leads us to examine linguistic data in hope of finding clues to Native categorizations of the environment and hence resource utilization strategies and siting decisions. For example, much is often made of material type preference in lithic studies. Native taxonomies can reveal unsuspected attributes of particular material types from the Native point of view (cf. Gould 1980). Additionally, we understand that when "Coyote created the world he got tired/lazy and dropped the salmon on the western side of Lolo Pass." The lack of this resource must have been deemed significant by Salish speakers since so many variants of this particular tale are extant (cf. Weisel 1952; Boas 1918).

Since the prehistoric inhabitants of the Butte District were hunters and gatherers, we suggest that the following factors may be significant in understanding subsistence strategies, settlement patterns, and siting decisions:

1. seasonal availability of resources;
2. scheduling decisions made to maximize efficiency in terms of Factor 1;
3. monitoring costs created by the need for information to make proper scheduling decisions;
4. caloric efficiency of using particular resources (a function of density, visibility, accessibility, competition for, processing, and monitoring costs);
5. the reliability/predictability of particular resources; and
6. the centrality of lithic sources and other non-edible essential resources relative to the distribution of food resources.

Furthermore, we view social relationships among various groups of hunters and gatherers as a significant intervening variable in resource utilization and siting decisions (cf. Ray 1939; Anastasio 1972). Resources not in a band's immediate area may be made available through kinship networks and/or trade. Village/camp siting decisions may be significantly affected by the presence or absence of hostile/friendly relations with other groups.

Following Jochim (1979), we suggest that significant factors affecting settlement size are resource density, size of catchment area, variety of economic activities, and necessity for cooperative labor. Population aggregation is not only dependent upon the density of particular resources, but also on their reliability (Wilmsen 1973). Mobility strategies of hunters and gatherers are a function of resource dispersion, density, location, and moving costs (Kelly 1983). A significant intervening variable in the Butte District is the rugged topography and the availability of mountain passes and drainage systems which both served to channel movement of human groups.

In times of resource stress, there are essentially two ways to increase resource reliability. One is to increase the diversity of resources exploited, while the second is to increase the efficiency of getting a single relatively abundant resource (Hayden 1981). We hypothesize that, in the Pre-horse period, inhabitants of the Butte District depended on the first option. In the Post-horse period, the second option was possible. Therefore, we see a qualitative distinction between the adaptive strategies of the Pre-horse and Post-horse periods. Consequently, we view all ethnographic analogies drawn from groups within the Butte District to be of the discontinuous type (Gould 1980).

Our employment of the techniques of ethnoarcheology, the science of discard, is twofold. First, we regard the proper use of ethnographic data in an archeological context to be the construction of models of site formation, placement, and so on, which can be compared with archeologically observed patterns. The disparity between the models and patterns of material remains will generate clues regarding processes of culture change. Second, review of the ethnographic record can help researchers to formulate specific testable hypotheses.

1.5 Prehistory of the Butte District

1.5.1 Spatial Concepts

The purpose of this section is to develop a framework for viewing Butte District prehistory. In order to do this, we must examine the concepts of Culture Area, subarea, horizon, tradition, and phase as they have been applied to archeological manifestations in the District. Second, we will review the various chronological frameworks that have been applied to the District.

A Culture Area is a major physiographic division which is inhabited by a series of human groups that share more culture traits with each other than with groups outside their shared area. The boundaries of any particular Culture Area cannot be assumed a priori to extend backward into prehistory.

The Butte District falls within three ethnographic Culture Areas, the Plains, the Basin, and the Plateau, but mostly within the Plateau (Figure 3). The basic contrast between these three areas is commonly expressed in terms of subsistence systems. Life in the Plateau is characterized by dependence upon anadromous fishes and camas, the Basin on broad-spectrum hunting and gathering, with special emphasis on rabbits and pine nuts, and the Plains by dependence on the specialized hunting of bison and with relatively little emphasis on plant resources.

Culture Areas are also used as a way of classifying archeological data. Rarely are any temporal boundaries specified, i.e., they are assumed to be valid throughout prehistory, and generally their spatial boundaries are assumed to be coterminous with the ethnographically defined Culture Areas. For example, Willey (1966) defined the Interior Plateau Archeological Area, which is essentially coterminous with Kroeber's Columbia-Frasier Culture Area. Rarely, however, do archeologists working in the District make this distinction between archeological and cultural areas. Rather, they simply assume that ethnographically defined culture areas can be interpolated into the prehistoric past. Thus, much of the archeological literature relevant to the Butte District refers to Basin, Plains, and Plateau influences. These "influences" are rarely specified, but rather seem conceptualized as vague sorts of mobile trait complexes (cf. Roll [1982] as a notable exception to this practice).

Archeological Areas can be divided into subareas. Subareas, as defined by Willey and Phillips, are geographic units "which possess qualities and degrees of cultural unity that give them a definite usefulness in archeological or ethnographic studies" (1958:20). Several subareas have been postulated as being directly relevant to the Butte District. The most important includes Malouf's Montana Western Region (1957), which was followed by Napton's (1966) Montana Western Region and the Montana Southwestern Region, and Roll's Barrier Falls Subarea (1982). Unifying factors that underlie these three schemes are: (1) they exclude the area east of the Continental Divide from the transmontane area, (2) the regions/subareas are characterized by mountainous topography, and (3) the Continental Divide is a major boundary between subareas. Malouf's Montana Western Region was defined on the basis of mountainous topography and associated vegetational and climatic conditions. Napton assumed the validity of Malouf's scheme, but defined a second subarea on the basis of putative Basin influences. Roll based his subarea on the absence of anadromous fishes. Paralleling Napton, he classified the southwestern part of the area as being part of the Basin, while Malouf associated the same area with the Plains. Figure 4 locates these subareas relative to District boundaries.

1.5.2 Temporal Concepts

Before reviewing the chronological schemes that have been applied to the District, the meaning of several terms must be clarified. This report incorporates the following temporal and temporal/spatial terms:

horizon: A horizon is a set of culture traits which co-exist in a relatively brief time span over a wide geographic area (Willey and Phillips 1958). An interaction sphere, for example, may be manifested archeologically as a horizon (Willey and Sabloff 1974).

tradition: A tradition is a series of sequentially related cultural manifestations in a relatively small geographic area (Willey and Phillips 1958).

period: A period is a major temporal unit characterized by particular environmental conditions and subsistence strategies. The particular environmental conditions and subsistence strategies will vary between subareas. Some subareas may be characterized by changing environmental conditions between periods, but relatively unchanged subsistence systems; the reverse is also possible.

Figure 3: Culture Area Boundaries Relative to the Butte District

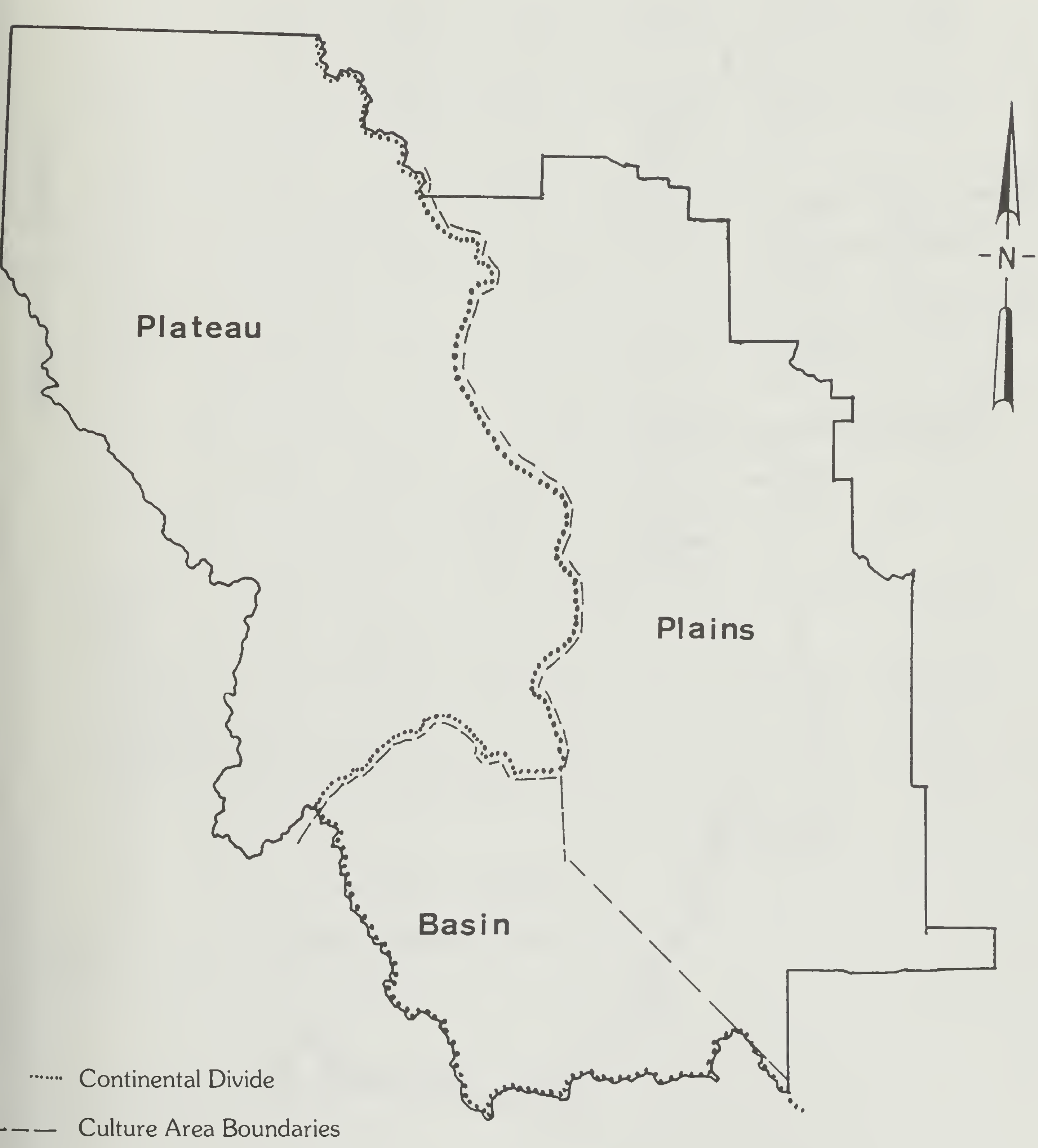


Figure 4: Postulated Spatial Units Relative to the Butte District

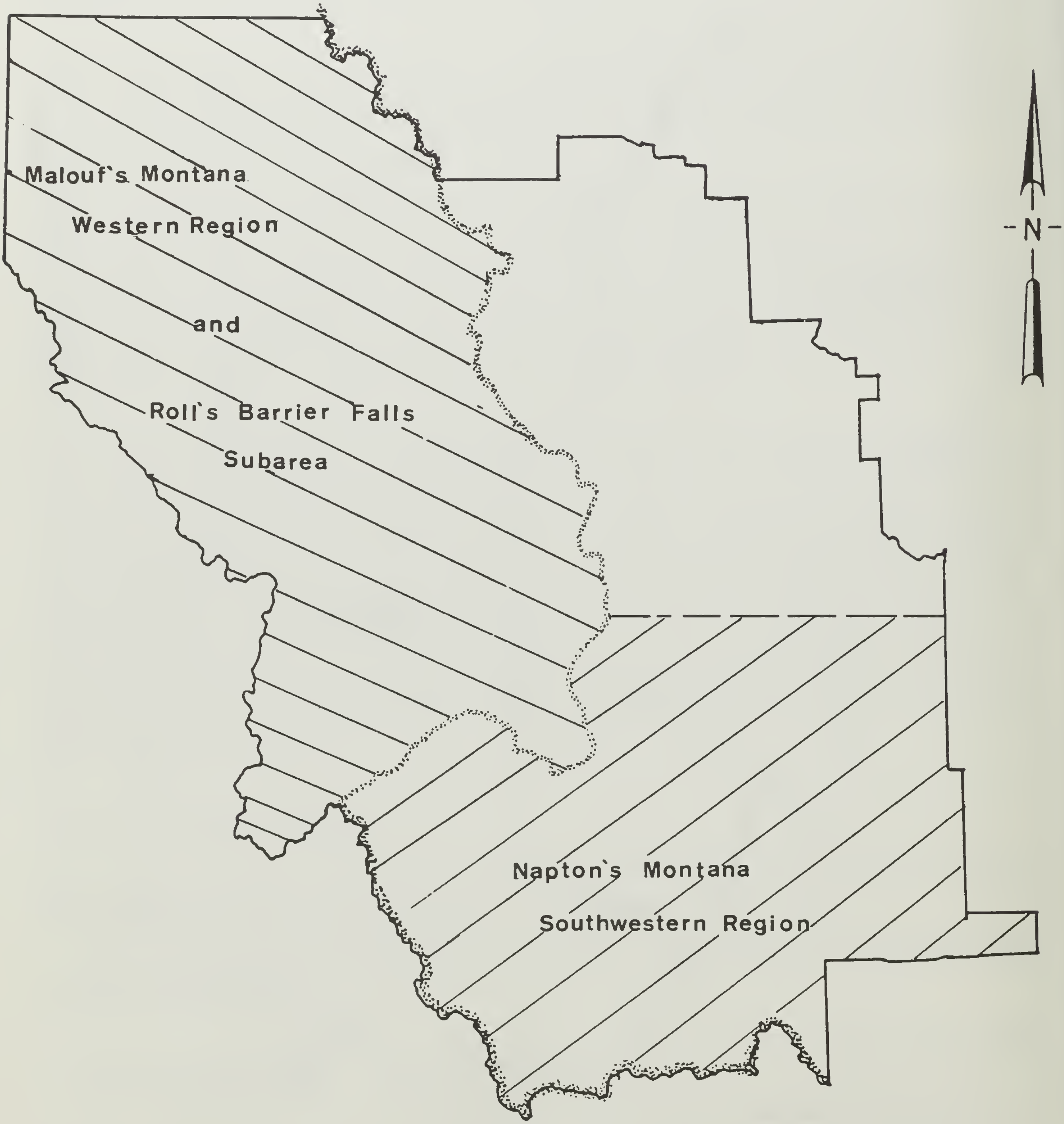


Figure 5: Chronological Schemes Applied to the District

	Birch Creek[1]	Snake River[2]	LAURD[3]	Northwestern Plains[4]	Frison 1978	Flint 1982
1,950	Lemhi	Numipu	Yarnell			
		Piqunin		Old Women's	Late	
1,000			Warex		Prehistoric	NRMPP*V
		Harder	Stonehill	Avonlea		
	Blue			Besant		
AD/BC	Dome					
			Kavalla	Pelican	Late	
1,000	Beaverhead			Lake	Plains	
		Tucannon		Hanna	Archaic	NRMPP IV
2,000			Calx	Mc Kean	Middle	
					Plains	
3,000	Bitterroot		Bristow	Oxbow	Archaic	
						NRMPP III
4,000				Mummy	Early	
		Cascade		Cave	Plains	
5,000			???	Complex	Archaic	
				Lusk-		
6,000				Frederick		
				Complex		NRMPP II
	Birch			Cody-		
7,000	Creek	Windust		Alberta		
				Complex	Paleo-	
8,000				Hell Gap-	indian	
				Agate Basin		
				Complex		
9,000				Folsom		
10,000	???					NRMPP I
11,000						
12,000						
13,000						

[1] Swanson 1972

[2] Leonhardy and Rice 1970

[3] Roll 1982

[4] Reeves 1969, as modified by Roll 1982

*NRMPP = Northern Rocky Mountain prehistoric period

Table 1. Phase/Period and Associated Projectile Points.

Phase	Projectile Points
	Birch Creek (Swanson 1972)
Lemhi	51% Desert SN, 14% Bitterroot 33% Beaverhead preforms
Blue Dome	64% CN, 19% Beaverhead preforms, 6% Blue Dome, 6% Bitterroot
Beaverhead	44% CN, 18% Bitterroot, 10% Birch Creek
Bitterroot	7% Birch Creek, 1% lanceolate concave base, 54% Bitterroot SN, 5% CN, 11% Others, 23% Beaverhead preforms
Birch Creek	58% Birch Creek, 13% Plainview-McKean, 13% Birch Creek SN, 1% CN, 4% Others
	Snake River (Leonhardy and Rice 1970)
Numipu	Ethnohistoric period—no projectile points
Piqunin	Small triangular SN and CN
Harder	Large, basal-notched, Snake River CN, Small basal and CN
Tucannon	Contracting stem, Snake River CN
Cascade	Side-notched dart points
Windust	Short bladed, shouldered, straight or contracting stems and straight or slightly convex bases
	LAURD (Roll 1982)
Yarnell	Small triangular SN
Warex	Avonlea
Stonehill	Variant of Besant
Kavalla	Pelican Lake/Harder
Calx	Basal indented (McKean), Stemmed basal indented (Duncan, Hanna)
Bristow	Oxbow, straight based lanceolate?
	Northwestern Plains (Reeves 1969, as modified by Roll 1982)
Old Women's	Small triangular SN
Avonlea/Besant	Avonlea, Besant
Pelican Lake	Pelican Lake
Hanna	Hanna
McKean	McKean
Oxbow	Oxbow
Mummy Cave Complex	Mummy Cave
Lusk-Frederick Complex	Lusk, Frederick
Cody-Alberta Complex	Cody, Alberta
Hell Gap-Agate Basin Complex	Hell Gap, Agate Basin
Folsom	Folsom
	Frison (1978)
Late Prehistoric	Plains SN, Prairie SN, Besant
Late Plains Archaic	Avonlea, Pelican Lake
Middle Plains Archaic	Hanna, Duncan, Yonkee, McKean, Lanceolate, Mallory
Early Plains Archaic	Oxbow, Bitterroot, Pahaska SN, Blackwater SN
Paleoindian	Lusk, James Allen, Lovell Constricted, Pryor Stemmed, Frederick, Angostura, Cody, Alberta, Hell Gap, Agate Basin, Midland, Folsom, Goshen, Clovis, Pre-Clovis?
	Flint (1982)
NRMPP V	Fine Triangular, Desert SN, Mummy Cave CN, Samantha SN, Shallow SN, (Besant Variant), Blue Dome SN
NRMPP IV	Small NRM Convex Base CN, NRM Convex Base CN, Pelican Lake, Elko, Hanna Stemmed, NRM Fishtail
NRMPP III	Lanceolate Indented Base, "Eared" Indented Base, Stemmed Indented Base, Salmon River SN, Bitterroot SN
NRMPP II	Leaf shaped (Cascade), Lovell Constricted, Pryor Stemmed, Haskett, Birch Creek, Alberta, Scottsbluff
NRMPP I	Folsom, Clovis, Wilson Butte I

PART II. ENVIRONMENTAL BACKGROUND

2.1 Physical Environment

2.1.1 Nature of the Terrain

The Butte District of the BLM incorporates a large area in western Montana with approximate dimensions of over 500 km north-south and over 350 km east-west. Twenty-two counties are entirely within the District. The District is bordered by Canada on the north, Idaho on the west and south, and Yellowstone Park in Wyoming on the southeast.

The Continental Divide borders the District on the south and then curves through the middle of the District (Figure 6). Much of the District (particularly the portion east of the Continental Divide) assumes the nature of broad semi-arid river valleys bordered by fairly rugged but separated mountain ranges. The Missouri River and its tributaries drain the area east of the Continental Divide (Figure 6). The Missouri River rises in the southern portion of the District from the confluence of the Jefferson, Madison, and Gallatin Rivers. It then flows north and is joined by several tributaries (Smith, Sun, and Teton Rivers) that rise within the Butte District. A portion of the Upper Yellowstone River is present in Park County on the eastern edge of the District.

The portion of the District west of the Continental Divide is drained by the Clark Fork River and its tributaries. The Clark Fork rises near Butte and flows generally to the northwest. The major tributaries include Flint Creek and the Blackfoot, Bitterroot, and Flathead Rivers. The Kootenai River also drains the extreme northwestern portion of the District.

Most of the river valleys are broad, level areas bordered at some distance by partially isolated mountain ranges. The Absaroka Range in the extreme southeastern portion of the District has the highest peaks, which include Montana's highest mountain, Granite Peak (3,901 m) (Montana Magazine 1981:32). The southern mountain ranges (Gallatin, Madison, Tobacco Root, Gravelly, Ruby, Tendoy, Centennial, Beaverhead and Pioneer Ranges) are less extensive and not as high as the Absaroka Range, but they do have many peaks above 3,000 m elevation.

Mountain ranges west of the Continental Divide are generally somewhat lower. Near the Continental Divide in the Bitterroot and Anaconda Ranges, and again in Glacier National Park near the Canadian Border, several peaks rise over 3,000 m. However, much of the western portion of the District slopes gradually downward to the west, and the uplifted mountain ranges rarely exceed 2,700 m. The lowest point in Montana is 555 m where the Kootenai River passes into Idaho. Although the absolute elevation of western ranges is somewhat lower than southern ranges, many are actually more rugged and substantial since they begin from a lower base. In particular, the combined Swan and Flathead Ranges (containing Glacier National Park and three wilderness areas) are perhaps the most rugged and spectacular terrain in the District.

2.1.2 Geology

The Butte District has widely diverse exposed geologic strata resulting from a complex set of sedimentary, tectonic, and volcanic events. The northwestern corner of Montana is dominated by Precambrian granites, schists, marbles, argillites, and quartzites (Figure 7). Precambrian strata are also exposed in belts throughout the southern and eastern portions of the District, but are integrated with Paleozoic and later strata.

Paleozoic strata are exposed in bands throughout the southern and eastern portions of the District and along the eastern front of the Rocky Mountains. Most periods of the Paleozoic era are represented, often in thin adjacent bands. Most of the Paleozoic strata are sedimentary sandstones, limestones, and shales, some interspersed with metamorphic quartzites (Ross et al. 1958). Several of the Paleozoic strata, particularly formations of the Mississippian Madison Group, contain exposures of workable chert.

Mesozoic strata, mostly of the Cretaceous period, are exposed on the eastern edge of the District and in a few bands in southwestern Montana. The Cretaceous strata consist of alternating sandstone and shale formations

Figure 6: Major Rivers and Mountain Ranges of the Butte District

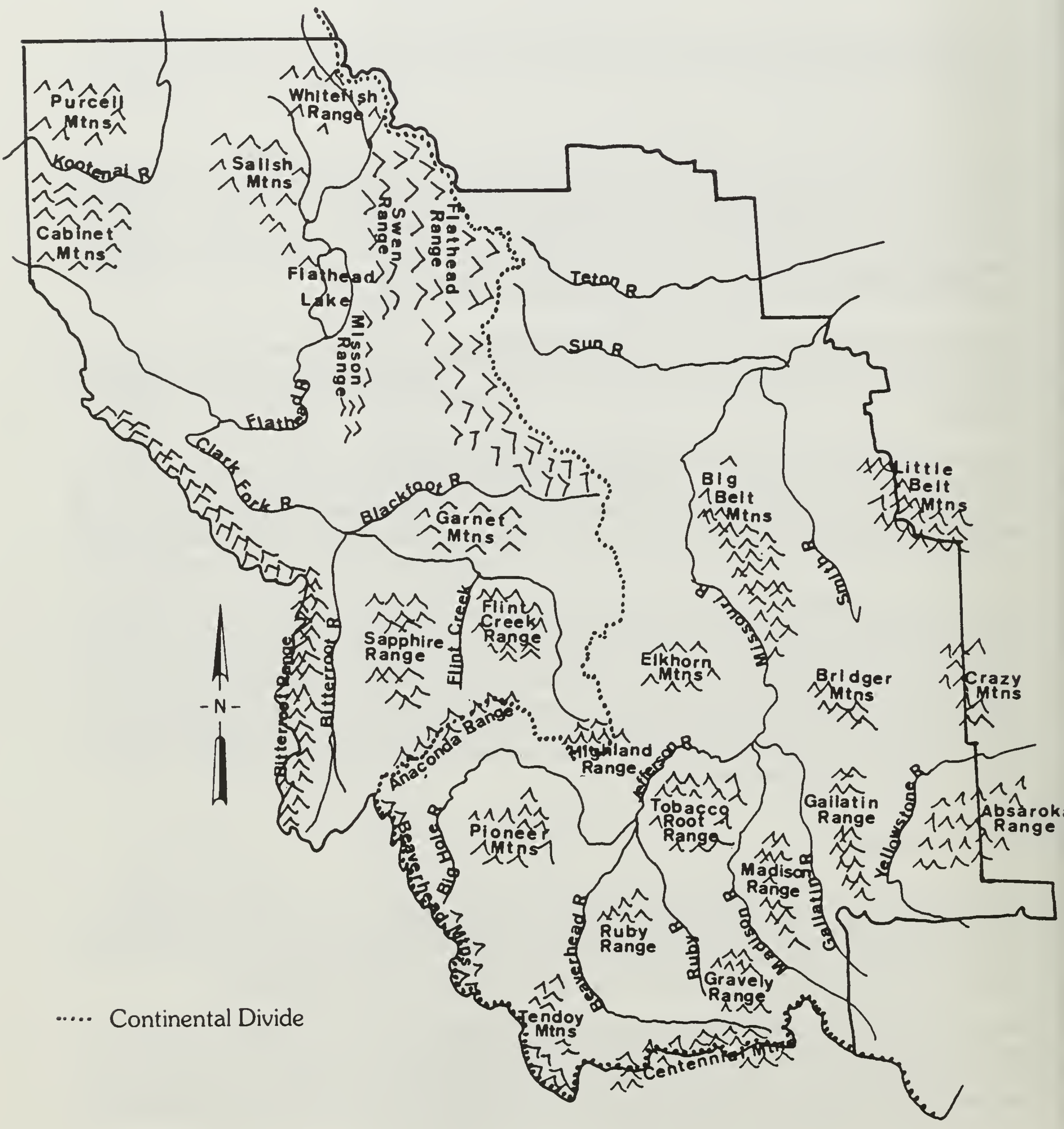
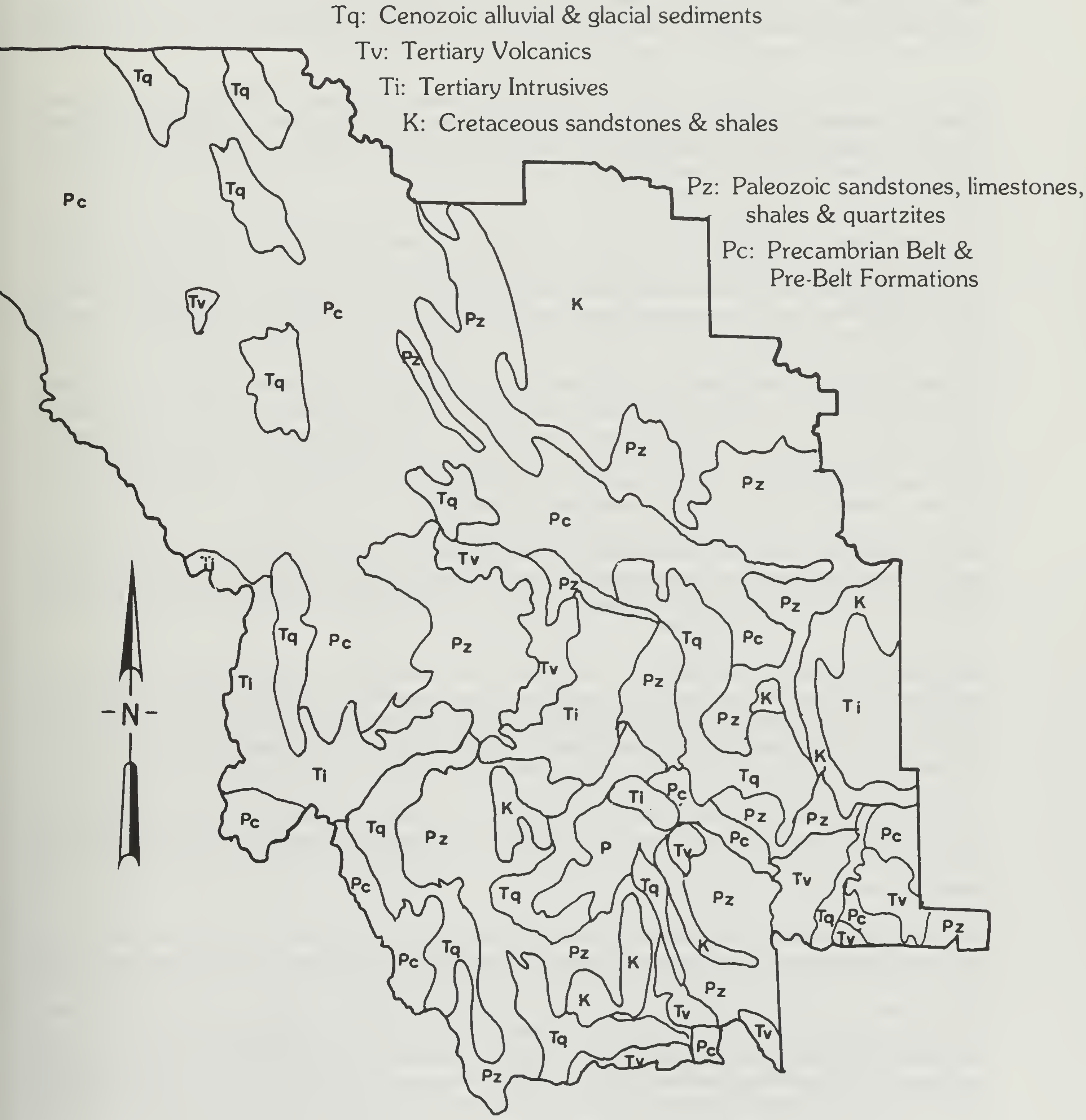


Figure 7: Exposed Geologic Strata



Tq: Cenozoic alluvial & glacial sediments
Tv: Tertiary Volcanics
Ti: Tertiary Intrusives
K: Cretaceous sandstones & shales
Pz: Paleozoic sandstones, limestones, shales & quartzites
Pc: Precambrian Belt & Pre-Belt Formations

(adapted from Perry 1962)

which resulted from alternating regressions and transgressions of a major mid-continental sea that barely reached the eastern edge of the Butte District (Gill and Cobban 1973).

Near the end of the Cretaceous, volcanic activity developed in a number of counties in western Montana. In many places, mostly in the southern portion of the District, eruptions produced flows of magma that cooled to form basalt and other extrusive volcanic strata. These areas are labelled as "Tv" on Figure 7. In other places, this magma cooled and crystallized below the surface and subsequent erosion has exposed these strata, such as the granite of the Boulder Batholith around Butte. These areas are labelled "Ti" on Figure 7.

The most recent strata of the Butte District consist of Cenozoic (mostly Quaternary) alluvial and glacial sediments. These strata occupy the major river valleys, particularly the Flathead, Big Hole, and Missouri River system valley. These strata consist of glacial till, alluvial fans, and alluvial floodplains which contain gravels, cobbles, and boulders from all other strata within the drainage system.

The distribution of these major exposed geologic types can be explained as a product of tectonic and volcanic events that began in the Mesozoic era and which continue in reduced intensity up until the present. About 80 million years ago, major uplift in the northwestern part of Montana raised Paleozoic strata which in turn broke away from underlying Precambrian rocks in great slabs and slid eastward (Montana Magazine 1981:8). This is the Overthrust Belt that formed several north-south trending mountain ranges, particularly the Swan and Flathead Ranges. In turn, this action left strata of Precambrian age exposed throughout northwestern Montana.

The Sapphire Range of Ravalli and Granite Counties is another overthrust block that slid eastward from Idaho about 75-70 million years ago. The Garnet, Flint Creek, and Anaconda Ranges are tightly folded strata that form a semi-circular arc around the Sapphire Block and were probably formed as this block slid eastward, rumpling strata in its path (Montana Magazine 1981:10). The Bitterroot Range just west of the Sapphire Range consists of Tertiary intrusive granite about 75 million years old and may represent the cause of the uplift that started the Sapphire Block on its way eastward. The Pioneer Range may be another slide block.

The mountain ranges of southwestern Montana, including the Ruby, Gravelly, Madison, and Gallatin Ranges, are ridges of older strata folded and raised along fault lines. The valleys between the ranges resulted when similar blocks dropped along fault lines (Montana Magazine 1981:12). This folding and faulting resulted in repetitive bands of upturned strata from all ages between the Precambrian and Cretaceous.

Several mountain ranges of southern Montana, including the Tobacco Root, Absaroka, and Crazy Ranges, all resulted from Cenozoic volcanic episodes around 50 million years ago (Montana Magazine 1981:14). In all cases, the volcanic activity forced older strata upwards. In the Absaroka Range, the magma extruded and is surrounded by Precambrian and Paleozoic strata. In the Tobacco Root and Crazy Ranges, the magma cooled underground, was later exposed as granite by erosion, and is surrounded by Precambrian and Paleozoic strata.

The mountain ranges on the eastern edge of the Butte District (Big Belt and Little Belt) and other ranges in central Montana were formed by domes that arched in the earth's crust (Montana Magazine 1981:13). These domes forced Precambrian strata to the surface, surrounded by rough concentric circles of sequential Paleozoic and Mesozoic strata.

Over the next 50-60 million years, the same forces that formed the major mountain ranges continued on a smaller and more isolated scale, producing and eroding isolated strata generally too small to map on a Districtwide scale. The main front of the Rocky Mountains continued to rise through the early Cenozoic as a result of thrusting and folding. Erosion continued and led to the formation of broad, open river valleys. Vulcanism continued, particularly in the southwestern part of Montana, and spread basalt flows over isolated areas. Relatively recent (Pliocene and Pleistocene) volcanic eruptions from the Island Park Caldera (Yellowstone National Park area) were instrumental in forming the Centennial Range and deposited up to 250 m of volcanic ash (Huckleberry Ridge Tuff) (Sonderegger et al. 1982:6-9). During the Pleistocene, mountain glaciers covered many of the higher locations in the Butte District. The glacial ice masses scoured exposed strata and meltwater erosion contributed to forming the area's present drainage system. In several locations, as around Missoula and Great Falls, major glacial lakes formed above temporary ice dams or blocked drainage courses.

2.1.3 Climate

The Butte District lies along the junction of two major climatic regions. The lower Clark Fork and Kootenai drainages in the northwestern portion of the District have a climate that represents a dry version of that present in northern Idaho and other locations in the Pacific Northwest (Baker 1944:239-241). The upper Clark Fork, Flathead, and entire Missouri drainages display a somewhat different climate more closely related to areas to the east in the Northern Plains.

The climate of the northwestern area is dominated by Pacific Westerly winds throughout most of the year. The Westerly air masses move from west to east, or frequently southwest to northeast, and bring mild Pacific winds and moisture inland (Daubenmire 1969:26). Several mountain ranges (Cascades, Western Rockies) stand in the path of the winds so that much of their moisture is lost before they reach the Butte District. Thus, northwestern Montana is the driest portion of this climatic region. The winds bring a mild oceanic influence well into the Rockies and produce temperate conditions throughout the year.

Temperature and precipitation in this northwestern area vary with altitude and exposure, but are generally more temperate and moister than in the rest of the District. Winter is the wettest season when much of the precipitation falls as snow (Baker 1944:240). January and December are the wettest months with average annual precipitation ranging from 400-900 mm per year at low elevations (valleys) and 1,000-2,500 mm per year in the mountains (Ross and Hunter 1976:53; USDC 1980:5). Average annual temperatures in the river valleys range from 6.6-8.3° C and are lower, 5.3-6.9° C, at mid-elevation (USDC 1980:2). Temperature extremes are less severe than in the rest of the District with annual highs rarely exceeding 38° C and lows rarely below -34° C. The river valleys have a frost-free season of around 100 days (Baker 1944:240).

The rest of the Butte District, including the upper stretches of the Clark Fork drainages and all areas east of the Continental Divide, is influenced by the Pacific Westerlies, but it also has a more continental component in its climatic patterns. In this portion of the Butte District, the Pacific air masses dominate throughout the spring and fall, but during the winter cold dry Arctic air masses intrude occasionally and block the flow of warmer and moister Pacific fronts. Likewise, during the late spring and summer, moist tropical maritime fronts, originating from the Gulf Coast, sweep across the Great Plains and bring southerly and easterly winds and rain to part of the District (Baker 1944; Borchert 1950).

As a consequence of the three alternating air masses in the eastern and southern portions of the District, the climate is generally drier and temperatures are more extreme. Average annual precipitation in the valleys and east of the mountains ranges from 250-500 mm per year (Ross and Hunter 1976:53-55). May and June are the wettest months as Tropical Maritime air masses augment moisture from the Pacific. Except at higher elevations, snowfall is moderate, rarely exceeding 250 cm a year. Thus, December, January, and February are the driest months of the year (Baker 1944:242). Generally, higher elevations receive 500-1,000 mm of precipitation a year, but a few western locations (Bitterroot Range) and higher peaks in Glacier National Park and the Flathead Range do receive substantial snowfall and annual precipitation from 1,500-2,500 mm per year (Ross and Hunter 1976:53).

The average annual temperatures of the eastern and southern portions of the District are generally lower than those of the northwestern areas. Average annual temperatures range from 3.3-6.7° C at lower elevations and as low as 1.6° C at mid-elevations (USDC 1980:2). Temperature extremes are severe, rising as high as 44° C in certain areas during the summer and as low as -46° C at lower and mid-elevations during the winter. The frost-free season varies from 90-120 days in the lower areas (Baker 1944:242).

Site-specific topography greatly influences weather conditions throughout the District. In general, temperature is lower and precipitation is higher at higher elevations. However, minor rain shadow effects exist on the leeward side of mountain ranges. Likewise, there is a minor approach effect which increases precipitation to the west of very high ranges. Also, cold air pockets form in low valleys during windless periods (particularly at night) and may produce substantially lower temperatures than on adjacent exposed slopes.

2.2 Biotic Environment

2.2.1 Vegetation

The distribution of vegetation types in the Butte District results largely from effective precipitation and soil conditions. Absolute elevation per se has very little effect on the distribution of plant communities. However, elevation is often an indicator of precipitation and temperature and, thus, often is cited as showing a strong correlation with vegetation types.

The amount of effective precipitation is probably the best key to the distribution of vegetation types. In general, six major sets of vegetational types, which are arranged here from lowest to highest effective precipitation, are present:

Grassland Steppe
Pine Juniper Forests
Douglas Fir Forests
Subalpine Fir Forests
Grand Fir Forests
Hemlock-Red Cedar Forests

Grassland Steppe. A number of grass- and shrub-dominated associations occur as climatic climaxes in the Butte District. Most grassland and shrubland types occur in the broad, semi-arid river valleys. Three sets of grassland and four sets of shrubland habitat types have been recognized for western Montana (Mueggler and Handl 1974). Dominant species include bluebunch wheatgrass (*Agropyron spicatum*), rough fescue (*Festuca scabrella*), and Idaho fescue (*Festuca idahoensis*) in the three sets of grassland habitat types. Subordinants vary from one habitat type to another, but western wheatgrass (*Agropyron smithii*), needle-and-thread (*Stipa comata*), and blue grama (*Bouteloua gracilis*) are common east of the Continental Divide, while Richardson needlegrass (*Stipa richardsonii*), Parry danthonia (*Danthonia parryi*), threadleaf sedge (*Carex filifolia*), and a variety of other grasses and forbs are common subordinants west of the Divide (Mueggler and Handl 1974). Most of the shrubland habitat types are dominated by xerophytic shrubs, particularly big sagebrush (*Artemisia tridentata*), shrubby cinquefoil (*Potentilla fruticosa*), and antelope bitterbrush (*Purshia tridentata*), with the previously mentioned grasses and various forbs as subordinants.

The other main occurrence of grassland/shrubland vegetation is at high ele subordinant or co-dominant in wetter forest types. It occurs as a major dominant in climatic climaxes in mesophytic (often at mid-elevations) forests in southwestern Montana and along the east front of the Rocky Mountains.

Douglas fir forests are more closed than xerophytic forests. The arboreal synusiae provides more complete coverage with Douglas fir, pine, juniper, and several spruce species most common. However, many of the same forbs and grasses of the grasslands are present, particularly bluebunch wheatgrass. Snowberry (*Symphoricarpos albus*), nine bark (*Physocarpus malvacens*), and pinegrass (*Calamagrostis rubescens*) occur as co-dominants in various climatic climaxes (Daubenmire 1969:35).

Subalpine Fir Forests. Subalpine fir (*Abies lasiocarpa*) dominated forests occur as climatic climaxes in slightly wetter situations throughout western Montana. These forests often occupy mid and higher elevations throughout the Butte District on both sides of the Continental Divide. They also occur as topographic climaxes in protected locations within the Douglas fir habitat types where the effective precipitation is higher.

Subalpine fir forests are fairly closed, with a relatively dense overstory of subalpine fir, Douglas fir, and spruce. There are many different subalpine fir habitat types, each with different co-dominants or major subordinants. Beargrass (*Zerophyllum tenax*), whortleberry (*Vaccinium* sp.), mountain hemlock (*Tsuga mertenseana*), myrtle pachistima (*Pachistima myrsinites*), pinegrass, and snowberry are all co-dominant in one or more climatic climax (Daubenmire 1969:34; Ross and Hunter 1976).

Unique edaphic and topographic climaxes also occur in subalpine fir forests. In alkaline soils, white spruce (*Picea glauca*) can replace subalpine fir as a dominant in an edaphic climax (Ross and Hunter 1976:36). In closed highland valleys, cold air pockets form and Engelmann spruce (*Picea engelmanni*) replaces subalpine fir as a dominant in topographic climax. In both cases, other conifers and the grasses and forbs of the understory change very little.

Grand Fir Forests. Grand fir (*Abies grandis*) occurs only as a minor subordinant throughout the southern half of the Butte District. However, in the northwestern part of the District where the Pacific oceanic climatic factors are most pronounced, grand fir occurs as a dominant in several climatic climaxes. This is a good example of the fact that moisture rather than elevational zonation is causal in plant distribution.

Grand fir forests are fairly dense with grand fir and Douglas fir the most common trees. Myrtle pachistima is often a co-dominant or subordinant. Higher elevations in northwestern Montana usually support subalpine fir forests.

Hemlock-Redcedar Forests. Western redcedar (*Thuja plicata*) and western hemlock (*Tsuga heterophylla*) are dominants in forests which occupy locations with the highest effective precipitation in the Butte District. This happens only in low valleys along streams and meadows of extreme northwestern Montana and is a clear exception to the higher the elevation the higher the precipitation rule. Redcedar and hemlock not only need high precipitation, but are also susceptible to extreme cold and, thus, are more typical of the Pacific oceanic climatic influences of eastern Washington and northern Idaho (Daubenmire and Daubenmire 1968).

Hemlock and redcedar forests are very dense, with a near total overstory of hemlock and/or redcedar, and occasional grand fir or Douglas fir trees. Co-dominants include shrubs and forbs such as myrtle pachistima, devil's club (*Oplopanax horridum*), broadleaf arnica (*Arnica latifolia*), and ferns.

2.2.2 Fauna

The Butte District supports a wide variety of mammalian taxa with more unique species than might be expected in an area of this size. The main reasons for high species diversity are the wide range of habitat types and the fact that the District contains the extreme edges of several physiographic and faunal regions. For example, while caribou (*Rangifer tarandus*) are part of a northern fauna adapted to closed spruce and fir forests, they also occur in the extreme northwestern part of the District which forms the edge of the species' range. On the other hand, arid-adapted forms typical of the Great Basin or Southwest, such as black-tailed jackrabbits (*Lepus californicus*), pygmy rabbits (*Sylvilagus idahoensis*), and western spotted skunks (*Spilogale gracilis*), occur in the extreme southern part of the District on the northern edge of their ranges. A few forms typical of the Pacific Northwest or the Inland Plateau, such as Columbian ground squirrels (*Citellus columbianus*), occur on the western edge of the District, and several typically Great Plains taxa, such as thirteen-lined ground squirrel (*Citellus tridecemlineatus*) and pronghorn (*Antilocapra americana*), are found on the eastern side of the District. In addition to these taxa that occur in only a small portion of the District, many others are common in many areas either because they have more cosmopolitan habitat preferences or because they are adapted to particular habitats that are more wide ranging throughout the District.

Table 2 lists 90 mammalian taxa native to at least a portion of the Butte District. The list is taken from data in Hoffman and Pattie (1968) and Burt and Grossenheider (1976), with a few recent changes in scientific nomenclature. Most of the native taxa are too small to be of much significance to prehistoric hunting populations. Additionally, the smaller, non-game mammals have had little research done on their habits and habitats and, thus, only the larger game forms will be discussed here.

Mountain Lion. Mountain lions are native to the entire District and inhabit all habitats except the highest elevations. As for all predators, population density is fairly low and they are rarely seen although actually relatively common in western Montana (Murphy and O'Gara 1982).

Grizzly Bear. Grizzlies are native to all portions of the Butte District, but have been greatly reduced in number and range. They occur in a number of habitats from river valleys to alpine meadows. They need to forage through a number of habitat types, particularly rock slides, alpine meadows, and heavy timber (Weckwerth 1971:121).

Table 2. Mammalian Taxa Native to the Butte District.

Common Name	Scientific Name	Common Name	Scientific Name
Insectivora (Shrews)			
Pygmy shrew	*Microsorex hoyi*	Merriam's shrew	*Sorex merriami*
Preble's shrew	*Sorex preblei*	Northern water shrew	*Sorex palustris*
Common shrew	*Sorex cinereus*	Vagrant shrew	*Sorex vagrans, S. obscurus*
Dwarf shrew	*Sorex nanus*		
Chiroptera (Bats)			
Hoary bat	*Lasiurus cinereus*	Silver-haired bat	*Lasionycteris noctivagans*
Spotted bat	*Euderma maculata*	Western big-eared bat	*Plecotus townsendi*
Big brown bat	*Eptesicus fuscus*	Long-eared bat	*Myotis evotis*
Fringed bat	*Myotis thysanodes*	Long legged bat	*Myotis volans*
California bat	*Myotis californicus*	Least bat	*Myotis leibii, M. subulatus*
Little brown bat	*Myotis lucifugus*		
Lagomorpha (Rabbits)			
Pika	*Ochotona princeps*	White-tailed jackrabbit	*Lepus townsendi*
Black-tailed jackrabbit	*Lepus californicus)*	Snowshoe hare	*Lepus americanus*
Pygmy rabbit	*Sylvilagus idahoensis*	Desert cottontail	*Sylvilagus auduboni*
Mountain cottontail	*Sylvilagus nuttalli*		
Rodentia (Rodents)			
Porcupine	*Erethizon dorsatum*	Beaver	*Castor canadensis*
Northern pocket gopher	*Thomomys talpoides*	Great Basin pocket mouse	*Perognathus parvus*
Wyoming pocket mouse	*Perognathus fasciatus*	Woodchuck	*Marmota monax*
Yellow-bellied marmot	*Marmota flaviventris*	Hoary marmot	*Marmota caligata*
Least chipmunk	*Eutamias minimus*	Yellow pine chipmunk	*Eutamias amoenus*
Redtail chipmunk	*Eutamias ruficaudus*	Uinta chipmunk	*Eutamias umbrinus*
Black-tailed prairie dog	*Cynomys ludovicianus*	Golden-mantled ground squirrel	*Citellus lateralis*
Thirteen-lined ground squirrel	*Citellus tridecemlineatus*	Columbian ground squirrel	*Citellus columbianus*
Uinta ground squirrel	*Citellus armatus*	Richardson's ground squirrel	*Citellus richardsoni*
Red squirrel	*Tamiasciurus hudsonicus*	Northern flying squirrel	*Glaucomys sabrinus*
Western jumping mouse	*Zapus princeps*	Western harvest mouse	*Reithrodontomys megalotis*
Northern grasshopper mouse	*Onychomys leucogaster*	Deer mouse	*Peromyscus maniculatus*
Bushy-tailed woodrat	*Neotoma cinerea*	Muskrat	*Ondatra zibethica*
Northern bog lemming	*Synaptomys borealis*	Sagebrush vole	*Lagurus curtatus*
Red-backed vole	*Clethrionomys gapperi*	Montane heather vole	*Phenacomys intermedius*
Water vole	*Arvicola richardsoni*	Prairie vole	*Microtus ochrogaster*
Long-tailed vole	*Microtus longicaudus*	Meadow vole	*Microtus pennsylvanicus*
Montane vole	*Microtus montanus*		
Carnivora (Carnivores)			
Mountain lion	*Felis concolor*	Lynx	*Lynx canadensis*
Bobcat	*Lynx rufus*	Grizzly bear	*Ursus arctos*
Black bear	*Ursus americanus*	Red fox	*Vulpes vulpes*
Swift fox	*Vulpes velox*	Coyote	*Canis latrans*
Wolf	*Canis lupus*	Marten	*Martes americana*
Fisher	*Martes pennanti*	Wolverine	*Gulo gulo*
River otter	*Lutra canadensis*	Badger	*Taxidea taxus*
Striped skunk	*Mephitis mephitis*	Western spotted skunk	*Spilogale gracilis*
Mink	*Mustela vison*	Black-footed ferret	*Mustela nigripes*
Short-tailed weasel	*Mustela erminea*	Long-tailed weasel	*Mustela frenata*
Least weasel	*Mustela nivalis*		
Artiodactyla (Even-Toed Ungulates)			
Pronghorn	*Antilocapra americana*	Wapiti	*Cervus elaphus*
Caribou	*Rangifer tarandus*	White-tailed deer	*Odocoileus virginianus*
Mule deer	*Odocoileus hemionus*	Moose	*Alces alces*
Bison	*Bison bison*	Mountain goat	*Oreamnos americanus*
Bighorn sheep	*Ovis canadensis*		

Today, they are confined to forested mountain areas, but Lewis and Clark encountered grizzlies repeatedly along the Missouri River valley from Great Falls eastward (Koch 1941).

Black Bear. Black bear are native to most of the District. They generally occur in forested habitat, including the open pine forests, and also venture into the sparsely wooded foothills (Weckwerth 1971:115). They are rare in the open prairie stretches on the eastern edge of the District and, indeed, were rarely reported by early explorers along the Missouri River, despite the abundance of grizzlies (Koch 1941:358, 362).

Pronghorn. Pronghorns are native to the lower and drier grassland areas of the Butte District. They were fairly common on the prairies east of the Continental Divide on the eastern edge of the District. They also occur in the broad river valley grasslands of Madison and Beaverhead Counties. West of the Continental Divide, there are really only two areas with good pronghorn habitat: the Deer Lodge Valley of Powell County and the lower Flathead Valley south of Flathead Lake in Sanders and Lake Counties. Early historic accounts make fewer references to pronghorn west or south of Great Falls.

Wapiti. Wapiti were probably native to all of the Butte District. Although often perceived as a forest animal, Lewis and Clark reported more wapiti along the Missouri River breaks and adjoining prairie than in forested mountain areas. Indeed, early explorers and settlers in northwestern Montana (Ross Cox, Alexander Ross, and David Thompson) rarely reported wapiti in the densest forests of the District (Koch 1941:360). One possible explanation for the lack of historic accounts of wapiti in forested areas is the fact that they often spend much of the warmer months feeding at higher altitudes where early explorers rarely ventured. Wapiti move to lower elevations to feed in open forests and grasslands in the winter where the snow pack is less extensive. However, some open locations in the upper elevation (1,800-2,100 m) sub-alpine zone are still occupied year round. Mid-elevation (1,375-1,800 m) dense coniferous forest zones see little use by wapiti (Stelfox and Taber 1969:198-201) and so, in a sense, the lack of historic reports of wapiti from heavy forests may be thusly explained.

Caribou. Caribou are probably only casual visitors to the Butte District today, ranging from the small remnant Selkirk Mountain herd of Idaho into the extreme northwestern corner of the District (Hoffman and Pattie 1968:66). Originally, their distribution in Montana was somewhat more extensive, but they probably never occupied more than the northwestern corner of the State. This was the southern edge of their distribution and populations were probably always small. They are virtually never mentioned in early historical accounts. They are perhaps the only ungulates in Montana that are properly associated with dense coniferous forests. They do feed on herbaceous and shrubby vegetation in open forests, but depend on mosses and lichen, particularly tree moss (*Alectoria*) found in heavy coniferous forest (Stelfox and Taber 1969:198).

White-tailed Deer. White-tailed deer are native to many areas of the Butte District. Their range covers most of the northern half of the District and they also occur along the major river valleys in the southern half and along the eastern edge of the District. Their habitat west of the Continental Divide includes most of the open Douglas fir and ponderosa pine forests. East of the Continental Divide, they are normally associated with deciduous vegetation in bottomlands along drainages (Allen 1971:71). They tend to be restricted to lower elevations, particularly during winter (Stelfox and Taber 1969:201).

Mule Deer. Mule deer are native throughout the Butte District (Egan 1971:53). They occur at most elevations and, when they are less common at lower elevations, it is usually because of more successful competition from white-tailed deer. Both species of deer are mentioned in early historic accounts and it is often difficult to identify which species was actually involved. Expeditions that moved up river valleys often killed dozens of deer (Koch 1941:360-361) in western Montana, many of which were mule deer. Mule deer favor broken country with increased shelter in the prairies. They are common in foothills and breaks habitats. In the mountains, they favor open grasslands and open forests. Their midwinter distribution is evenly divided between open locations of the upper elevation sub-alpine zone and open forests and grasslands at low elevations. They are not common in closed coniferous forests at mid-elevations (Stelfox and Taber 1969:201).

Moose. Moose are native to most of the Butte District. They are closely tied to timbered country and, thus, are rare in prairie counties. However, moose were mentioned in early historic accounts along river valleys (Missouri, Marias, and Milk) in prairie areas (Koch 1941:362). In mountainous areas, they depend on deciduous and herbaceous plants for food, particularly willow, dogwood, chokecherry, and aquatic plants and, thus, are most common along streams and in open forests or meadows. However, moose are less tied to open forests or grasslands than any of the other ungulates in the Butte District except for caribou. Throughout the year, they may be found from near timberline to low river valleys. Douglas fir and subalpine fir constitute a portion of their winter diet. Since their long legs permit more mobility in heavy snow, they can inhabit dense coniferous forest even through the winter.

Bison. Bison are typical plains grazers and were much more numerous in open prairies on the east side of the Butte District than in mountainous areas. Lewis and Clark reported numerous bison along the Missouri River in eastern Montana, but none above the Gates of the Mountains north of Helena (Koch 1941:359). However, bison are native to the river valleys of western Montana and were reported in several historic accounts, such as in the Big Hole River valley by the Alexander Ross expedition and in the upper Madison River Basin by the Raynolds expedition (Koch 1941:361, 363). Bison concentrate in the lower elevation river valley grasslands. They spend some time in timbered areas and in the mid to upper elevation subalpine zone, but are basically adapted to open forests or meadows and grasslands and spent little time in dense coniferous forests.

Mountain Goat. Mountain goats are native to the rugged mountain ranges at elevations from 1,500-3,350 m in western Montana (Foss and Rognrud 1971:107). The Alexander Ross expedition saw a number of mountain goats as they moved up the Bitterroot River valley in 1824 (Koch 1941:361). They occupy rugged open county in alpine and sub-alpine zones and usually only descend into the closed forests during severe winters (Rideout 1978:154).

Bighorn Sheep. Bighorn sheep were probably native to much of the Butte District. They were reported by Lewis and Clark in numerous locations both in eastern and western Montana (Walcheck 1976). They were fairly numerous in northwestern Montana and were reported in several other historic accounts (Ross Cox, Alexander Ross, Prince Maximillian, and James Stuart expeditions) in several river valleys, including the Bitterroot, Clark Fork, Upper Missouri, and Madison (Koch 1941:359-362). Bighorn feed on grasses, sedges, and forbs and occupy high altitude alpine and sub-alpine open country range in the summer. During the winter, they may descend to lower elevations, but only in proximity to open stands of grass and shrub with rocky escape terrain nearby (Wishart 1978:166).

Nonmammalian Game. (Birds and Fish) Most of the Butte District is within the Pacific Flyway for migratory waterfowl. Ducks, geese, and swans pass through the District and there are smaller resident populations of geese and a few ducks, such as redheads, that winter in the District (Witt and Salinas 1971:186-188). The Flathead Valley with Flathead Lake probably supports the greatest number of waterfowl in the District. Although reasonably diverse waterfowl pass through the District, it is not a particularly rich waterfowl area and lacks the high seasonal density of the prairie pothole region to the east.

Six game birds of the family Tetraonidae are also native to the District. This includes two prairie grouse, sharptail (*Pedioecetes phasianellus*) and sage (*Centrocercus urophasianus*); three forest grouse, blue (*Dendragapus obscurus*), ruffed (*Bonasa umbellus*), and spruce (*Canachites canadensis*); and the white-tailed ptarmigan (*Lagopus leucurus*). The prairie grouse are largely confined to the grasslands and shrublands of the low river valleys (R. L. Brown 1971; Martin and Pyrah 1971). Sage grouse are restricted to the southwestern and eastern portions of the District today, but once existed west of the Continental Divide. Sharptail grouse were more widespread in river valleys on both sides of the Divide, but neither prairie grouse was as common in the Butte District as further east.

The three forest grouse inhabit most of the Butte District, but are largely restricted to timbered terrain and thus are not common in the broad river valley grasslands. The spruce grouse has the most restricted distribution today, mostly west of the Continental Divide, but it may have been more widespread in the past. All of the forest grouse occur in dense coniferous or mixed coniferous-deciduous forest, particularly the spruce grouse. However, all three depend on substantial herbaceous vegetation and seeds (more abundant in open forests) and all breed in the highest densities in open ponderosa or Douglas Fir forests (Mussehl et al. 1971:144-145). Because of the mixed habitat requirements, forest grouse tend to favor seral forest stands, particularly those that burned or were clear cut 20-50 years ago.

The white-tailed ptarmigan is restricted to the high mountain ranges of the Butte District. They normally occur above timberline throughout the year (Chrest 1971:181). They are most common in the Swan, Flathead, and

Absaroka mountain ranges, but also occur in the Pioneer Range and probably several other high ranges. They are restricted to the alpine and sub-alpine zones and spend most of their time in open alpine areas.

Many different fish exist in the waters of the Butte District, but several are introduced species and most others are too small to be a viable resource base. Twelve species are native to the Butte District and are often larger than 10 cm long. Five species exist on both sides of the Continental Divide: mountain whitefish (*Prosopium williamsoni*), cutthroat trout (*Salmo clarki*), arctic grayling (*Thymallus arcticus*), longnose sucker (*Catostomus catostomus*), and burbot or ling (*Lota lota*). Two species were apparently restricted to the Missouri River drainage east of the Continental Divide: white sucker (*Catostomus commersoni*) and mountain sucker (*C. platyrhynchus*). The remaining five taxa are native to the Clark Fork or Kootenai drainage west of the Continental Divide: white sturgeon (*Acipenser transmontanus*), rainbow trout (*Salmo gairdneri*), dolly varden or bull trout (*Salvelinus malma*), northern squawfish (*Ptychocheilus oregonensis*), and largescale sucker (*Catostomus macrocheilus*) (C. J. D. Brown 1971). Of these 12 species, only the whitefish and suckers exist as native populations in sufficient densities to have been significant economic resources in the prehistoric past.

2.3 Paleo-Environments

Portions of the Butte District were covered by ice masses during the last major glacial episode and adjacent areas were also affected, with major glacial lakes in both the Clark Fork and Missouri River valleys and periglacial conditions near the glacial margins. Since the end of the Wisconsin glaciation, about 12,000 to 10,000 years ago in different portions of the District, the climate and resulting vegetation have undergone a number of shifts. Those shifts have resulted in expansion and contraction of the various habitat types described in this section. At times, the grassland and shrubland habitat types have expanded at the expense of presently forested terrain. At other times, closed forests have expanded into open forest areas and, in turn, grasslands and shrublands have been partially invaded by open forests. However, despite the various shifts in the boundaries of each set of vegetational types, the Butte District has always encompassed a variety of habitat types ranging from semi-arid grasslands through dense coniferous forests.

The broad outlines of past environments are drawn from a variety of palynological, geomorphological, and climatic studies performed in and near the Butte District. Pollen diagrams are available from the Yellowstone area (Baker 1976; Waddington and Wright 1974), Bitterroot Range (Mehringer et al. 1977), and Cabinet Range (Mack 1982). Geomorphological data are available from the Lemhi Range (Dort 1962), Glacier and Yellowstone Parks (Richmond 1965), and Alberta (Reeves 1969). Climatic patterns were summarized by Bryson et al. (1970).

Figure 8 summarizes the past environments of the Northern Rocky Mountains and Northern Plains as presented in various paleo-environmental studies. The Wisconsin glaciation ended and ice masses disappeared from the Butte District 12,000 to 8,000 years ago, depending on location and elevation. On the prairies and in western river valleys, this produced first cool, moist conditions with open forests and lush grasslands and later essentially modern xeric grasslands. At higher elevations, a cold sagebrush steppe (alpine in nature) was followed by open pine (whitebark and lodgepole), Douglas fir, and alder forests (Mack 1982; Mehringer et al. 1977). The climate was dominated by strong Pacific Westerlies.

Around 8,000-7,000 years ago, the climate began to warm. This Altithermal period or Atlantic climatic episode has been characterized as a hot, dry period in parts of western North America, but it may have been less severe in the Butte District. Pollen diagrams indicate an increase of diploxylon pine species (ponderosa?), lodgepole, larch/ douglas fir, and forest fires (Mack 1982), suggesting a climate warmer than today, but not necessarily drier (Mehringer et al. 1977). This period probably marked an expansion of grassland habitat types and a reduction of dense closed forests.

Following the Atlantic climatic episode (around 5,000 B.P.), the climate was cooler and perhaps moister. Initially, conditions were similar to those of today, but by 4,000 B.P. they continued in a cooler and wetter trend. This pattern was exemplified by the initiation of neo-glaciation (Temple Lake Stade) in mountain glaciers (Richmond 1965) and an increase in spruce and fir pollen in several diagrams (Baker 1976; Mack 1982; Mehringer et al. 1977).

Figure 8: Past Environments of the Study Area

Date B.P.	Alpine Glaciation Sequence[1]	Climatic Episode[2]	Climatic Conditions Relative to Modern[23]	Soil Development[3]
100 -	Present	Present	Modern	Modern (stable and alluviation
200 -	Gannett Peak Stade	Neo-Boreal	slightly wetter and cooler	Alluviation
300 -				
400 -				
500 -		Pacific I and II	slightly drier and cooler	Stability and soil formation
600 -				
700 -		Neo-Atlantic	warmer and wetter	Alluviation
800 -				
900 -	Interstate			
1,000 -				
1,100 -	Temple Lake II Stade			
1,200 -		Scandic	warmer and drier	Stability and soil formation
1,300 -				
1,400 -				
1,500 -				
1,600 -				
1,700 -			cooler and wetter	Alluviation
1,800 -		Sub-Atlantic		
1,900 -	Temple Lake I Stade			
2,000 -				
3,000 -				
4,000 -		Sub-Boreal	essentially modern	Stability and soil formation with minor alluvial cycles
5,000 -	Altithermal			
6,000 -		Atlantic	warm, dry Altithermal?	Erosion
7,000 -				
8,000 -	Later Pinedale Stade		essentially modern	Stability and soil formation with minor alluvial cycles
9,000 -		Boreal		
10,000 -		Pre-Boreal		
11,000 -	Interstate	Late Glacial	mostly cold and wet with some places just cool and moist	Alluviation
12,000 -				

Erosion

[1] Richmond 1965

[2] Bryson, Baerreis, and Wendland 1970

[3] Reeves 1969

This wetter, cooler trend reached its peak in the Sub-Atlantic climatic episode around 2,500 B.P. The Pacific air mass was less dominant. Springs were abnormally wet and winters were stormy (Bryson et al. 1970). This produced a relatively lush prairie and river valley grasslands. The forests, both open and closed, expanded. Most pollen profiles show the establishment of modern floral types (e.g., hemlock in the Cabinet Mountains) with little change after 4,000-2,500 B.P. (Mack 1982; Mehringer et al. 1977).

After 2,500 B.P., most evidence for climatic change is provided by geomorphological data since modern floral assemblages were already established. Following the Sub-Atlantic climatic episode, mountain glaciation began to decline at the end of the Temple Lake Stade. River valleys experienced stability and soil formation during the warmer and drier Scandic climatic episode (Reeves 1969). Following the Scandic, conditions remained warmer (thus, mountain glaciation moved into an interstadial episode), but river valley alluviation indicates a wetter period (Reeves 1969). This warmer and wetter period, called the Neo-Atlantic climatic episode, lasted from 1,100 B.P. to about 650 B.P. It probably involved another expansion of forest types and lusher grasslands. The climate indicates a reduction of Pacific air mass dominance and, thus, spring was probably wet, with winters that may not have been as stormy. Following the Neo-Atlantic, the subsequent Pacific and Neo-Boreal climatic episodes represent first cooler and drier and then cooler and wetter periods. These cooler conditions produced minor mountain glacier advances (Gannett Peak Stade) (Richmond 1965). However, moisture conditions were close enough to modern that vegetation communities probably changed only minimally.

The above description of local paleo-environments suggests a general trend of alternating cool and warm and dry and moist conditions. These patterns are accurate only in describing general trends since each climatic episode contains several subsumed micropatterns. For example, the final Neo-Boreal climatic episode is characterized as slightly cooler and wetter than modern conditions, but this should be thought of as an average for the episode as a whole. Tree ring studies that span part or all of this episode indicate a majority of average or wet years, but a minority (about 40%) of years drier than the modern average (Kraenzel 1955; Will 1946).

Reher (1977) has characterized the cycles of climatic variation in terms of first, second, and third-order drought or wet periods. The long-term climatic episodes are comparable to third order droughts (i.e., Atlantic) or wet periods (i.e., Sub-Atlantic). Within each third-order period there are shorter second-order (100-200 years) droughts or wet periods and brief first-order (1-10 years) dry or wet climatic cycles. Therefore, the Atlantic climatic episode is characterized as a generally warm and possibly dry period that lasted several thousand years. However, within the Atlantic there were shorter cycles spanning a decade or perhaps a century that were cooler or wetter than the norm for the episode and perhaps even cooler or wetter than modern conditions. The "Dirty Thirties" is a good example of a first-order drought during modern conditions.

In many ways, the first- and second-order droughts and wet periods were more important for human populations than were the long-term averages of the third-order periods or climatic episodes. The first- and second-order cycles were too short to show up in pollen diagrams because most of the vegetation was too long lived for different communities to be established. However, there probably was a definite change in the productivity of each vegetational type during the shorter cycle. Coupland (1958:288) has shown 70-90% reductions in biomass and hence forage capability on shortgrass prairies during severe first-order droughts like the Dirty Thirties. This translates into much-reduced carrying capacities for grazing and browsing ungulates and the human populations that preyed on them.

Areas with a mosaic of different habitat types like those of the Butte District are least susceptible to the boom-and-bust population cycles that result from prolonged and severe climatic changes. Severe droughts on the large expanses of open prairie produced widespread forage reduction and severely reduced carrying capacity for ungulates (Ellison and Woolfolk 1937). However, in the mountains and valleys the effects of the Dirty Thirties were less severe. Dessication in the semi-arid river valleys was compensated for by increased forage production as adjacent forests assumed a more open nature.

2.4 Significant Resources for Prehistoric Groups

2.4.1 Lithics

The Butte District is rich in cryptocrystalline and fine-grained lithic materials used for prehistoric tools. Four major sets of lithic material occur in the District: quartzites/argillites, basalts/andesites, ignimbrite/obsidian, and cherts/chalcedonies.

Quartzites/argillites. Quartzite and argillite are sandstone and shale, respectively, that were subjected to extreme pressure over time and now are firmly consolidated (metamorphic or semi-metamorphic rock) (Perry 1962:23). These lithic types are common in Precambrian strata, particularly in the northern portion of the District. Most exposures of quartzite and argillite are not suitable for tool manufacture (internal fractures, grain size too coarse, and weak bedding planes), but several types are flakable, particularly for making unifaces and retouched flakes, i.e., Kootenay argillite. Potential procurement locations (either through actual quarrying or more informal gathering) are widespread over much of northwestern Montana and other isolated Precambrian exposures. Both types, particularly quartzites, also occur as river cobbles and could be obtained and used for great distances downstream from their origin.

Basalts/andesites. Basalt and andesite are products of Tertiary volcanic activity which occur either as extrusives or shallow intrusives. They are fairly common throughout the southern half of the District. Many exposures of both materials (particularly andesite) are too coarse grained to permit regular conchoidal fractures, but some types (particularly basalt) are so fine grained that they initially appear to be chert. In addition to widespread occurrence at the site of origin, both materials are common in river gravels. The Madison River, in particular, contains numerous flakable basalt cobbles which were often used for making prehistoric tools.

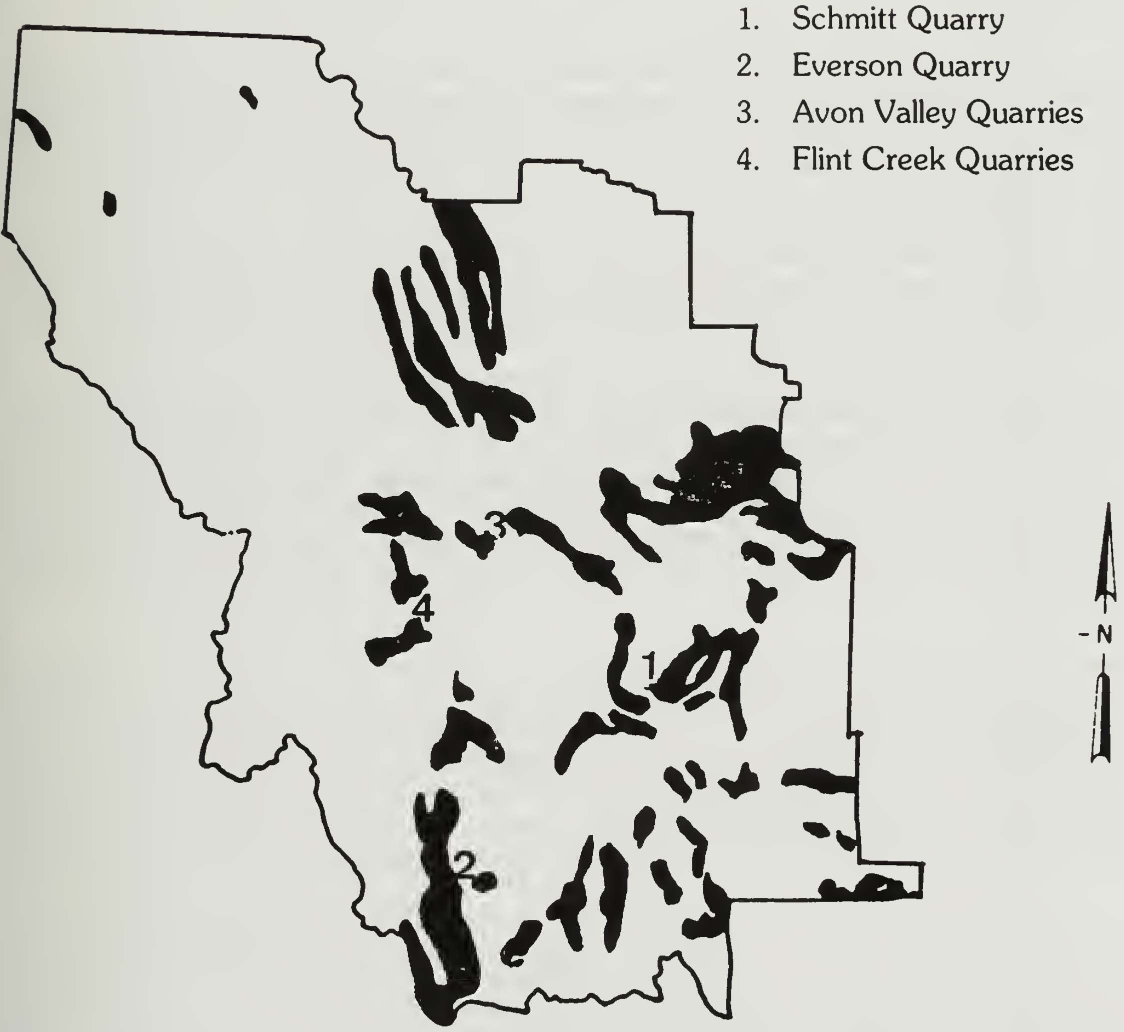
Ignimbrite/obsidian. Both materials are of volcanic origin. Obsidian is volcanic glass extruded as a liquid which then cooled in flows. Ignimbrite is a welded tuff extruded as coarse volcanic ash and then pressed into an opaque glassy material under the weight of overlying strata. Obsidian, per se, probably does not occur naturally in the Butte District, but it does outcrop in the adjacent Yellowstone National Park (i.e., Obsidian Cliff), and it is possible that there are minor low-grade exposures just outside the Park. Ignimbrite occurs across the southwestern border of the District in the Centennial Mountains. It is the result of consolidation of the “densely welded tuff” and “chill zones” of the Huckleberry Ridge Tuff (Sonderegger et al. 1982:35-37) and perhaps other ash flows. Both ignimbrite and obsidian were extensively quarried and collected by prehistoric groups, and many of the finer worked tools in the District were made from these materials.

Cherts/chalcedonies. Cherts and chalcedonies are sedimentary deposits of silica dioxide which commonly occur in limestones and cavities in Tertiary volcanics. Both types are common in the Butte District. The cherts that occur in Tertiary volcanics are less predictable in location since they formed in individual or sets of cavities. The chert is often of very high quality, but may be restricted to relatively small locations in the volcanic outcrop. These cherts are most common in the southern portion of the District.

Cherts that occur in limestones are more common and widespread across the Butte District. Limestones are fairly common in Paleozoic strata across the southern and eastern portions of the District. Several of these limestones contain cherts as lenses and nodules. Several Paleozoic limestones contain cherts of variable qualities, but the Mission Canyon and Lodgepole Formations of the Mississippian Madison Complex have, by far, the most and highest quality chert (Chelini 1965). Major exposures of the Madison Complex are shown in Figure 9, but minor outcroppings occur in numerous other locations throughout the southern and eastern portions of the District.

A number of prehistoric chert quarries have been documented in Paleozoic limestone outcroppings. Four of the major quarry areas are shown on Figure 9 (Davis et al. 1978; Davis 1981; Flint 1982; Hester et al. 1977). The Schmitt quarries are definitely in Madison Complex limestone. However, other quarries, such as South Everson, occur in areas with complex geology, including both Madison and other limestones and Tertiary volcanics (Davis 1981:60-63). Thus, the lithology of specific quarried materials is difficult to determine.

Figure 9: Major Exposures of the Madison Complex in the Butte District



(after Chelini 1962:11)

In summary, there are few locations within the Butte District where workable raw material (either in bedrock exposures of river cobbles) is not available within a short distance. Argillite and quartzites are common in the northern part of the District and quartzites also occur in Paleozoic strata in the southern half of the District. The southern and eastern portions of the District have numerous chert deposits in limestones and in Tertiary volcanics. Basalts and andesites occur in Tertiary volcanics, particularly in southern portions of the District. Ignimbrite outcrops in the Centennial Mountains and obsidian was available, adjacent to the southeastern edge of the District in Yellowstone Park. Other flakable materials (fine-grained rhyolite, siltstone, and opalized wood) also occur in the District, particularly in the southern half. However, these materials were not used extensively, perhaps because of the quality and quantity of better raw materials elsewhere in the District.

2.4.2 Plant Foods

The Butte District incorporates a large number of habitat types and consequently supports many different edible plant species. Various ethnographic and historic sources mention ways in which plants were used as food sources. Since the early accounts were not written by botanists, it is often difficult to determine the actual species involved. Early in the twentieth century, ethnobotanies were compiled by combing through early accounts. Two primary ethnobotanies are available for portions of Montana: Blankinship (1905) and Gilmore (1919, republished in 1977). Gilmore's work is marginally pertinent to the Butte District since it focuses on plants and human groups of the prairies along the Missouri River. Secondary ethnobotanies have been compiled by reviewing earlier works and adding a few original ethnographic descriptions or obscure historic references. The secondary sources are less exhaustive (Hart 1976), area specific (Davis et al. 1982), or describe a single ethnographic group (Johnston 1969).

Table 3 lists plants mentioned as food sources by Blankinship (1905) and the secondary sources native to the Butte District. The plants are arranged by the portions (roots, berries, seeds, and so on) eaten. Species that provided two types of food are listed under both categories. Occasionally, several species in a genus are all suitable food and several taxa were probably eaten (i.e., wild onions, *Allium* sp.), but in most cases only one or two species in a genus provide a viable food resource. For example, *Psoralea esculenta* has an edible root, but other species such as *P. agrophylla* have a pencil-thin root and were used only to rub on wounds (Johnston 1969:149). The scientific names in Table 3 were modified by us, as per Booth (1972), Booth and Wright (1959), and Hahn (1973), to conform to modern nomenclature.

Table 3 indicates that an enormous number of plants in the Butte District were eaten by Native American groups. A total of 35 species are listed with utilized root stock, 27 with utilized fruits, 14 with utilized seeds, 15 with utilized stems or leaves, and 10 with utilized inner bark or sap. Undoubtedly, additional references exist to other plants eaten at one time or another, and several edible species in the District are not listed in any of the ethnobotanies as utilized taxa (i.e., mushrooms). At first glance, this gives the impression of an area with very rich plant food resources and heavy utilization by Native American groups. However, actual plant utilization patterns are best characterized as extensive rather than intensive, and the ethnobotanies are more exhaustive than representative.

A number of plants in Table 3 were rarely if ever eaten by groups in Montana. They are all native to the Butte District but, in many cases, the reference to their use is from distant groups, such as the Klamath of Oregon or groups in California. A good example of this is yucca (*Yucca glauca*) which was eaten (flowers, fruits, and seeds) by Indians of the Southwest, but in Montana was only reported as used to treat breaks and sprains, to stop bleeding, to heal sores, and to make soap (Davis et al. 1982:228). Portions of all of the plants are edible and might have been eaten in rare instances but only a few were reported as significant resources.

Only nine of the taxa in Table 3 are reported as systematically collected and eaten regularly by a majority of the people in a group. Four of these are root or tubers (*Camassia quamash* — camas, *Lewisia rediviva* — bitterroot, *Lomatium* sp. — biscuitroot, and *Psoralea esculenta* — breadroot scurfpea). Four others are berries or fruits (*Amelanchier alnifolia* — serviceberry, *Prunus virginiana* — chokecherry, *Shepherdia argentea* —both numerous and extensive, and Plateau groups practiced the cross-cultural, mutual utilization of this resource. Ames and Marshall (1980) indicated that the quantity and reliability of camas led to the development of semi-sedentary villages in the southern Plateau. Although camas was also a major plant resource in the Butte District, it did not exist in sufficient quantity to permit this level of specialization. Extensive camas grounds were noted in several areas: Camas Prairie near Missoula, Horse Prairie Creek, Little Bitteroot, Big Hole, Bitterroot, and Flathead

Table 3. Wild Plant Foods Native to the Butte District

Wild Plant	Reference Code
Roots, Tubers, Corms	
Allium cernuum (and other species)(wild onion)	(B,D,H,J)
Astragalus canadensis (Canada milkvetch)	(H,J)
Balsamorrhiza incana (hoary balsamroot)	(B)
B. sagittata (arrowleaf balsamroot)	(B,J)
Calochortus apiculatus (mariposa lily)	(B,J)
Camassia quamash (common camas)	(B,H,J)
Cirsium hookerianum	(J)
Claytonia lanceolata (western springbeauty)	(B,H)
Erythronium grandiflorum (dogtooth lily)	(B,H,J)
Fritillaria pudica (yellow bell)	(B,N,J)
Glycyrrhiza lepidota (wild licorice)	(B,H)
Helianthus maximiliani (Maximilian sunflower)	(B,J)
Leucocrinum montanum (mountain star lily)	(B)
Lewisia pygmaea (pigmy bitterroot)	(J)
L. rediviva (bitterroot)	(B,D,H,J)
Liatris punctata (dotted blazingstar)	(J)
Lomatium ambiguum (Wyeth biscuitroot)	(B)
L. cous (mountain lomatium)	(B,H)
L. dissectum	(B)
L. triternatum (nineleaf limatium)	(B,J)
Microseris nutans (nodding microseris)	(B)
Musineon divaricatum (wild parsley)	(B,D)
Nuphar variegatum (and other species) (painted yellow pond lily)	(B,H,J)
Perideridia gairdneri (yampa)	(B,H,J)
Polygonum bistortoides (western bistort)	(J)
Potentilla anserina (silverweed cinquefoil)	(B,J)
Psoralea esculenta (breadroot scurfpea)	(B,H,J)
Pteris aquilina (bracket fern)	(B)
Sagittaria cuneata (arum-leaved arrowleaf)	(B,J)
S. latifolia (common arrowleaf)	(B,J)
Scirpus acutus (western bulrush)	(B,J)
S. validus (great bulrush)	(B)
Valeriana edulis (edible valeriana)	(B,J)
Wyethia amplexicaulis (mule-ear wyethia)	(B)
W. helianthoides (sunflower wyethia)	(B)
Berries, Fruits	
Amelanchier alnifolia (western serviceberry)	(B,H,J)
Arctostaphylos uva-ursi (kinikinnick)	(B,H,J)
Astragalus crassicarpus (groundplum milkvetch)	(B,D,J)
Berberis repens (Oregon grape)	(B,H)
Cornus stolonifera (red dogwood)	(H)
Crataegus douglasii (black hawthorn)	(B,J)
Disporum trachycarpum (rough-fruited fairy-bell)	(J)
Elaegnus commutata (silver-berry)	(B,J)
Fragaria virginiana (strawberry)	(B,J)
Juniperus scopulorum (rocky mountain juniper)	(D)
Lonicera involucrata (twin-berry honeysuckle)	(B)
Mamillaria vivipara (pink pincushion cactus)	(B,D,J)
Opuntia polyacantha (plains pricklypear)	(B,D,H,J)
Prunus virginiana (chokecherry)	(B,H,J)
Rhus trilobata (skunkbush sumac)	(B,D)
Ribes aureum (golden currant)	(B,D)
R. cereum (squaw currant)	(B,D,J)
R. lacustre (swamp currant)	(B)
R. setosum (redshoot gooseberry)	(B)
Rosa sp. (wild rose)	(B,D,H,J)
Rubus idaeus (red raspberry)	(B)
Sambucus melanocarpa (black elderberry)	(B)
Shepherdia argentea (buffalo-berry)	(B,H,J)
S. canadensis (Canadian buffalo-berry)	(B,H)
Symphoricarpos occidentalis (western snowberry)	(B,J)
Vaccinium globulare	(B,H)
V. membranaceum (thinleaved huckleberry)	(B,J)

Table 3. Wild Plant Foods Native to the Butte District

Wild Plant	Reference Code
Seeds	
Amaranthus graecizans (tumbleweed pigweed)	(B)
Beckmannia syzigachne (American sloughgrass)	(B)
Chenopodium sp. (lamb's quarter)	(B,J)
Cleome serrulata (Rocky Mountain bee plant)	(D)
Elymus canadensis (Canada wildrye)	(B)
Galium boreale (northern bedstraw)	(D)
Helianthus annuus (common sunflower)	(B,H,J)
Linum perenne (blue flax)	(D)
Mentzelia albicaulis (whitestem blazingstar)	(B)
Oryzopsis hymenoides (Indian ricegrass)	(J)
Pinus albicaulis (whitebark pine)	(B)
P. flexilis (limber pine)	(D)
Polygonum douglasii (Douglas knotweed)	(B)
Triglochin maritima (shore arrowgrass)	(B)
Leaves, Stems, Flowers	
Alectoria fremontii (black tree lichen)	(B,H)
Asclepias speciosa (showy milkweed)	(B)
Carex sp. (sedge)	(B)
Cirsium foliosum (elk thistle)	(H)
Cleome serrulata (Rocky Mountain bee plant)	(D)
Oxyria digyna (mountain sorrel)	(B)
Rumex crispus (curl dock)	(B,J)
R. occidentalis (western dock)	(B,J)
R. salicifolius (Mexican dock)	(B,J)
Sarcobatus vermiculatus (greasewood)	(B)
Tragopogon pratensis (meadow salsify)	(D)
Typha latifolia (common cattail)	(B,H,J)
Urtica dioica (stinging nettle)	(B)
Vicia americana (American vetch)	(B)
Yucca glauca (yucca)	(B,D)
Inner Bark, Sap	
Acer negundo (boxelder)	(B,H,J)
Larix occidentalis (western larch, tamarack)	(H)
Pinus albicaulis (whitebark pine)	(B)
P. contorta (lodgepole pine)	(B,H)
P. ponderosa (ponderosa pine)	(B,H)
Populus deltoides (plains cottonwood)	(B,H)
P. tremuloides (quaking aspen)	(J)
P. trichocarpa (black cottonwood)	(H)
Thuja plicata (giant cedar, western red cedar)	(B)
Tsuga heterophylla (western hemlock)	(B)

Reference Code: B = Blankinship (1905), D = Davis et al. (1982), H = Hart (1976), J = Johnston (1969).

Valleys (Roll and Henry 1982:4.10). It also occurs in small numbers in many mid-elevation meadows and seasonal marshes. Several ethnographic groups dug camas bulbs (Hart 1976:14-15).

Bitterroot was the most important root crop among the Flathead and Kutenai (Hart 1976:47). Although it occurs throughout the District, there are few known dense concentrations of the plant. Turney-High (1941:33) noted that each Kutenai woman gathered two grain sacks of bitterroot per season. Roll and Henry (1982:4.14) calculated that this quantity would feed a family of five for about three days and, thus, bitterroot should not be considered more than a minor component of the annual diet.

Biscuitroot and breadroot scurfpea both occur in the District, but never in the concentrations found outside the District. Biscuitroot is more common in the Plateau and was a major plant food for the Nez Perce (Hart 1976:26). Breadroot scurfpea is most common on the prairies and was the most important root crop in eastern Montana (Hart 1976:61). Plant densities of 3-7/m^2 are common in northeastern Montana (Deaver 1983a:7.17), but density is much lower in the Butte District.

The four berry crops were gathered and eaten fresh or dried for winter use. Buffaloberry is much more common east of the Continental Divide and plants only produce berries every two to three years. The other berry crops were probably more productive in the Butte District. However, berry crops are not totally reliable and certain dry years produce very small yields. The remaining plant that was systematically collected is black tree lichen (tree mosses) which was cooked down into a black gelatinous mass. It is most common in the northwestern part of the District. The Flathead consider it more of a luxury than a staple, but each family might consume 11 kg a year (Hart 1969:11).

The extensive utilization of plant foods, but not intensive dependence on any one particular species, is consistent with the nature of the environment in the Butte District. The mosaic nature of habitat types in the District produces high species diversity, but low density. With a rigid scheduling system, it would be possible to collect various plant foods throughout six to eight months of the year, particularly if groups moved from low to high elevations to capitalize on varying ripening dates. However, none of the major plant foods are dominants in vegetative communities. All plant foods eaten (except for the casual utilization of tree inner bark) are derived from minor subordinants and when each habitat type has a limited extent (in the mosaic distribution), it is difficult to gather a large volume of any species without constant moves. Most locations in the District support a few examples of several edible plant species, but they are not all ripe or ready to harvest at the same time and there are few locations that support dense and extensive concentrations of a single edible taxon.

Calorie gain and expenditure figures in Davis et al. (1982:167-172) suggest problems with depending on diverse but diffuse plant foods. An hour effort with a digging stick can burn about 180 kcal and, at the Pilgrim site, could produce 484 kcal of edible portion of bitterroot or 768 kcal of wild parsley. Food preparation (drying, grinding, or cooking), storage, transport, and digestion cost calories that would further reduce the net calorie capture. However, these two taxa were still profitable to collect at the Pilgrim site. On the other hand, the other 15 edible species present at the site were not profitable because they were not sufficiently concentrated. The same situation exists for most edible taxa in most locations within the Butte District. In general, the most efficient utilization system for diffuse resources involves casual collection of many different species (on an encounter basis), but minimal scheduled dependence on any single taxon. This is compatible with the ethnographic description of very extensive plant utilization, but intensive utilization of only a few and then only in selected locations of higher concentrations.

2.4.3 Game Resources

Faunal resources of the Butte District present a picture similar to that noted for plant foods: high diversity of taxa, but lower density of any particular taxon. The multiple climatic types of the District have produced a wide variety of vegetative habitat types, and these, in turn, support diverse faunal communities ranging from semi-arid types with pronghorn to moist temperate types with mountain caribou. However, each extreme type is restricted to a portion of the District and occurs in lower numbers than in areas with greater expanses of its preferred habitat. The productivity and viability of various potential game resources are discussed below for several major taxa and groups.

Ungulates. Throughout most of the western United States, the larger ungulates have constituted the principal subsistence focus throughout prehistory. Forested areas are not the most productive habitat for large ungulates. All of the native ungulates, even the browsing cervids, depend on grasses for a large percentage of their diet and grass forage is more productive in open, non-forested habitat types. Stelfox and Taber (1969:205) summed up this basic relationship by noting that the edges of coniferous forests and grasslands and shrublands are the most important foraging areas for big game and that "understory plant production increases proportionately as overstory canopy decreases."

The Butte District contains substantial grassland, shrubland, and forest edge habitat, but it also has extensive closed forests. Thus, overall it has less of the ideal habitat types than do nearby Plains and Great Basin areas. As a consequence, the overall ungulate density in the Butte District is lower than for adjacent expanses of grasslands. Stelfox and Taber (1969:204) described an earlier study in the forested mountains of western Alberta where 11,300 large ungulates occupied an area of about 7,680 km^2, for a density of 1.47/km^2 and a diversity of seven species (moose, 2 deer, wapiti, bighorn, mountain goat, and caribou). The greatest density and diversity appeared in a portion of the total area (2,816 km^2) with both foothills and mountains and an ungulate density of 2.03/km^2. In the open prairies of eastern Montana, comparable density estimates run from 8.19/km^2 (Petrides 1956) to 11.27/km^2 (K. Deaver 1983a), but species diversity drops to four to six taxa even when including historically extirpated forms which were not a factor in the Alberta study.

A few estimates of individual ungulate carrying capacities or densities for portions of the Butte District are available. Roll and Henry (1982:4.4) listed white-tailed deer as the most abundant taxon in the Kootenai River region of northwestern Montana with a density of 1.9/km^2. This was followed by mule deer with a density of 1.0/km^2, wapiti at 0.12/km^2, and bighorn sheep at 0.04/km^2. This particular area contains open and forest edge areas along the river. Smaller populations of these taxa along with mountain goats and moose were present in forested and mountainous areas of northwestern Montana.

The southern and eastern portions of the District are drier and contain more open vegetation. Ungulate densities are not readily available, but several comparisons with the Kootenai region can be made. Mule deer are more common than white-tailed deer in the southern and eastern portions of the District. Wapiti were probably more numerous here than in the Kootenai region. The typical prairie ungulates (bison and pronghorn) were common on the eastern edge near Great Falls and also existed in substantial numbers in the river valley floors in the southern portion of the District. Bison were reported in early accounts of the Bitterroot Valley and probably occurred in other river valleys as well as in mid-elevation grasslands and meadows. Mack and Thompson (1982:758-759) noted that the staggered phenology and habits of the true prairie grasses (*Bouteloua* and *Agropyron smithii*) are better suited to providing forage for bison throughout the duration of the spring and summer (when the young are nursing and cows require the maximum food) than are grasses of the *Agropyron spicatum* province. The eastern edge of the District is part of the prairie province and would have had a higher carrying capacity for bison (and probably pronghorn) than the *A. spicatum* dominated grasslands of southwestern Montana. Bison certainly occupied parts of the Butte District, particularly the southern river valleys; but because of the less open grasslands habitat and grass phenology, they occurred in lower densities than on the open prairie. In general, prairie ungulates (bison and pronghorn) probably outnumbered cervids in the prairie portions of Cascade, Teton, and Pondera Counties, but cervids, particularly mule deer, were the most common ungulate throughout the rest of the District east of the Continental Divide.

Carnivores and Small Game. Neither the larger carnivores nor the smaller mammals are productive enough to constitute an exclusive or even the main prey taxa. Small game such as rabbits or rodents are numerous. Roll and Henry (1982:4.4) estimated the snowshoe hare density at 61.5/km^2, but the average live weight was only 1,350 gm. Although the total meat yield per unit area is as high or higher for hares as for all of the ungulates except white-tailed deer, the energy expended chasing and processing hares is only slightly below the gross calorie gain. Hare and other small mammal bones are rare in Kootenai sites, probably because the net calorie gain is so much lower than for deer or the other ungulates.

Large carnivores present a different situation. Several (black and grizzly bear and mountain lion) are large, but they are rare. By definition, carnivores exist at a lower density than their prey species, and when some of the prey (deer) are almost as big as the predators and much more common, hunting the carnivores simply cannot be as efficient. Additionally, the carnivores are potentially dangerous. In general, both carnivores and small game can constitute a profitable but minor contribution to the diet when taken on an opportunistic (encounter) basis, but would be inefficient as a main prey species.

Birds. The game birds of the District are all relatively small and none exist in high densities. Grouse of one type or another occur throughout the District, but never in high densities and are generally difficult to capture without modern firearms. Waterfowl are seasonally common, but only abundant in a few areas and, again, capture is difficult. Again, birds could contribute a minor amount to the prehistoric diet if taken on an encounter basis.

Fish. Fishing is frequently mentioned as a major prehistoric subsistence activity within the Butte District, partly because of ethnographic accounts of fish traps and weirs and partly because the northern portion of the District was the ethnographic home of groups with Plateau affiliation. The general impression of Plateau subsistence revolves around the use of fish and camas. In reality, as Roll (1982) has documented, the Barrier Falls Subarea of the Plateau lacks salmon and contains less camas and is thus not representative of the typical Plateau subsistence patterns. Some figures are available from which fish densities in northwestern Montana can be estimated. The

Kootenai and Fisher Rivers have far more whitefish and suckers than trout and can produce combined meat yields of 80-500 kg/300 m of river (Roll and Henry 1982:4.16). Smaller rivers and creeks of northwestern Montana are better trout habitat and yield 7 to 40 kg of meat per unit of surface acre (about 500 m length on average) (May et al. 1979). The other larger fish species are too rare to make a serious addition to these yields.

These figures suggest a reasonable resource base, particularly if fish were taken in quantity during annual spawning runs. However, fish are not sufficiently common so as to constitute a major subsistence item as they do in eastern Washington and northern Idaho. Roll and Henry (1982:4.16) estimated that an annual harvest of 25% of the fish during spawning runs could only support seven people for a year as a sole subsistence item.

2.4.4 Summary of Resources

The consistent impression of resources in the Butte District is one of great diversity and only localized density of particular types. The northern portion of the District has a few localized concentrations of plant resources (camas in the Flathead and Little Bitterroot River valleys), moderate seasonal fish concentrations, and higher densities of deer than any other game animal. The most efficient subsistence strategy would be based on deer with some scheduled plant collection and seasonal fishing, along with opportunistic use of other resources when encountered. Roll and Henry (1982) indicated that prehistoric sites along the Kootenai River offered data which conform with this strategy, particularly the utilization of deer in winter river valley concentrations.

The southern and southeastern portion of the District had reasonable concentrations of mule deer and local concentrations of wapiti, white-tailed deer, and bison. Pronghorn occurred in open areas. Plant resources were common and some local concentrations (bitterroot, cous, wild parsley, and camas) existed. The most efficient subsistence strategy would have involved a dependence on mule deer with opportunistic use of bison and wapiti concentrations. Scheduled plant gathering would have been profitable near concentrated plant food sources, and opportunistic utilization of dispersed plants would have been possible over most of the area throughout all but the winter months. This is the pattern seen at the Pilgrim tipi ring site with deer best represented in the faunal assemblage, followed by bison and possibly antelope and circumstantial evidence for seasonal plant use (Davis et al. 1982). A similar pattern exists at many sites in the southern portion of the District. However, the presence of occasional bison kills along with bison bones in many sites suggests that, when bison existed in sufficient numbers, they may have become the primary game focus temporarily.

The northeastern portion of the District (Cascade, Teton, and Pondera Counties) sits on the edge of prairie habitat and thus supported higher densities of bison and pronghorn and localized concentrations of prairie plants such as breadroot scurfpea and berries. The most effective subsistence strategy would have been a dependence on bison with scheduled gathering of scurfpea and berries and minor use of other ungulates. This is the pattern seen at 24CA74 on the Sun River (HRA 1983) and the Bootlegger Trail site (Roll and Deaver 1980) just outside the District and is consistent with the high frequency of bison kills along the Sun River in Cascade County.

Western Montana has long caused difficulties for those seeking to categorize its inhabitants into one Culture Area or another. This area lacks the concentrations of bison that would have permitted a highly specialized bison hunting adaptation, resulting in a Northwestern Plains type of affiliation. On the other hand, the lack of an intensive salmon/camas adaptation makes it difficult to think of the area as part of the Plateau. No single resource exists in strong enough concentrations to support populations practicing an exclusive and specialized subsistence pattern. However, the area does have a wide variety of resources and perhaps the best characterization of the area results from advantages of diversity over density. Although the District was not ideally suited to sustain highly specialized subsistence strategies, it could support more stable adaptations because of its diversity.

The diversity of habitat types in the District could support populations throughout the range of climatic and environmental fluctuations better than the more homogeneous environments of the Plateau or Plains. When the climate shifted into drier periods (as during the Altithermal), the closed forests of the Butte District shifted to a more open nature, which resulted in more forage and partially or wholly compensated for the dessication of grasslands. At the same time, in the prairies bison and human populations probably suffered as forage yields dropped, and salmon and camas yields may have been impacted similarly in the Plateau. When the climate shifted into wetter periods (as during the Sub-Atlantic), this probably produced lusher grasslands, and the increased snowfall concentrated game in the accessible river valleys during the winter, which permitted greater hunting efficiency. In short, the mosaic of habitat types of the Butte District supported such a diverse and stable resource base that the area may have served as refuge for neighboring specialized groups during adverse conditions, as well as supporting its own locally adapted populations.

PART III. CULTURAL BACKGROUND: THE ETHNOGRAPHIC DATA BASE

3.1 Sources and Limitations of the Data Base

The Butte District encompasses parts of three Culture Areas: the Plains, the Great Basin, and the Plateau. The earliest sources document the presence of ethnic groups from all three areas in the District (Chamberlain 1892; Coues 1897, 1965; Mooney 1892-93; Thwaites 1966a, b). While assessing the cultural background of the District, we reviewed the major ethnographic works on the Blackfoot, Crow, Kutenai, Kalispel, Spokane, Coeur D'Alene, Palus, Cayuse, Nez Perce, Flathead, and Shoshone-Bannock. Our review focused on two main topics: material culture and subsistence activities. The rationale for this focus is quite simply that it is from these two topics that the most information can be derived that is directly related to site formation and site placement. Specific note was made of any mention of (1) tools: types, manufacturing processes, who made and used them, and so on (2) housing: types, when used, by whom, for what duration, and variation in form, and so on (3) siting decisions: external/camp placement relative to environmental variables, seasonal and/or yearly cycles, internal arrangement within the camp, or personal placement of material items with habitation structures, and (4) subsistence activities: the utilization of plant and animal resources.

There are three basic limitations to the ethnographic data base compiled for this project. First, since many ethnographers, e.g., Turney-High (1937, 1941), were relatively uninterested in material culture and/or subsistence activities, the coverage for some groups is correspondingly poor. Second, in all cases quantitative data about the population's actual diet is nonexistent. Third, the early explorers' and missionaries' journals (e.g., De Smet, A. Henry, D. Thompson, and Lewis and Clark) recorded items of material culture and subsistence activities only in an incident-specific fashion. The limitation inherent in these works is that, while they can be used to document that one group at one particular time and place took 300 fish in 3-4 hours, they do not yield systemic information, i.e., how often fishing occurred, with what regularity at that site, by that or any other group of people, and so on. Both sources of ethnographic data are further restricted in their usefulness in that both record information in the Post-horse period. The applicability of these data to the Pre-horse period cannot be assumed; it must be tested.

Before describing the ethnographic data base, it is necessary to discuss various ways that this type of data can be made archeologically relevant.

3.2 Uses of the Ethnographic Data Base

Traditionally, the ethnographic record has been used as a sort of endless catalogue of analogues. The archeologist searched the catalogue to find parallels with his data base and the found/discovered similarities were treated as an "explanation for" the archeological data. Two examples of this approach directly relevant to the Butte District are T. Kehoe's (1960) study of tipi rings and Kidwell's (1968) study of conical-timbered lodges. Both of these studies combine archeological site data, ethnohistoric sources, and informants' testimonies to interpret the functional parts of the built environment. In both cases, description of analogues is seen to constitute explanation. More specifically, Kehoe presented stone rings as remnants of tipis and Kidwell interpreted conical-timbered lodges as products of all-male hunting and/or war party activities. In other cases, such searches for analogues in the ethnographic record have been used to assign ethnic affiliations to particular sites in the District, e.g., Hogan (1969). Ethnographic analogy is used almost axiomatically to infer function from form (cf. Foor 1982).

Archeologists who otherwise adhere to the strict scientific method have assumed a sort of intuitive license when dealing with the ethnographic record. This does not usually present much of a problem until the archeologist tries to go from the ethnographic record to the prehistoric subsistence base (K. Deaver 1983a; Roll 1982). Quite commonly, the ethnographic record does not replicate the archeological evidence of subsistence. There are many reasons why this can occur which have nothing to do with the ethnographic record, such as archeological sampling bias, differential preservation, and so on. However, of immediate concern here are biases built into the ethnographic record.

3.2.1 Continuous Vs. Discontinuous Analogies

A continuous analogy is one drawn from antecedent peoples of the immediate area of the archeological data. A discontinuous analogy is drawn from a different place or a distant time. The continuous analogy is the basis for the direct historical approach, which is exemplified by Kehoe's interviewing of modern Blackfoot regarding the formation of sites they had actually occupied in and by the use of ethnohistoric site-specific records to augment archeological excavations at that same site.

Discontinuous analogy was used by Kidwell (1968) when he used information from a variety of ethnic groups that have no documented association with the sites in question to infer site function and by Hogan (1969) when she used data from the ethnographic present to interpret Middle Prehistoric period game traps. Binford (1980) has argued for and elaborated the use of discontinuous analogies by seeking analogues in cultures which manipulate similar environments in similar ways, regardless of their temporal or geographic occurrence. This type of approach was used most recently in District archeology by Roll (1982). Roll tested and rejected an Inuit (Eskimo) derived model of subsistence strategies in his work in the Kootenai region.

Both the continuous and discontinuous types of ethnographic analogy can be useful to the archeologist if approached in a systematic fashion. The direct historical approach based on continuous analogy can provide the framework for major interpretations, as did Kehoe's work with stone feature sites.

Discontinuous analogy can focus researchers' attention to differing adaptations in structurally similar environments (cf. Wright et al. 1980).

On the other hand, non-systematic use of the ethnographic data base can lead to untestable assertions at best and incorrect interpretations at worst. Intuitive, non-systematic use of the ethnographic record can be used to provide an analogue for almost anything. For example, projectile points, commonly assumed to be weapon elements, were also used as hair ornaments (Grinnell 1923), decorating tools to modify bone (Teit 1900), and as fetishes in medicine bundles (Ewers 1958).

3.2.2 Analogues: Source of Explanation or Source of Hypothesis

Like Gould (1980), we find ethnographic analogy extremely useful. First, ethnographic analogy can allow the archeologist to become aware of alternative modes of behavior that would have been difficult to derive by logic alone. For example, before reviewing Ray (1933) for this project, we had always assumed that "heat-treated" lithic materials indicate thermal treatment of raw materials to increase the ease of working the material. Powell, in reference to Plateau Shoshoneans, provided a different basis for this commonly assumed interpretation that is directly relevant to the District:

> The obsidian or other stones of which the implement is to be made is first selected by breaking up larger masses of the rock and choosing those which exhibit the fracture desired and which are free of flaws; then these pieces are baked or steamed, perhaps I might say annealed, by placing them in damp earth covered with a brisk fire for twenty-four hours, then with sharp blows they are still further broken into flakes approximating the shape and size desired. For the more complete fashioning of the implement a tool of horn, usually of the mountain sheep, but sometimes of the deer or antelope, is used. The flake of stone is held in one hand, placed on a little cushion made of untanned skin of some animal, to protect the hand from flakes which are to be chopped off, and with a sudden pressure of the bone-tool the proper shape is given. They acquire great skill in this, and the art seems to be confined to but a few persons, who manufacture them and exchange them for other items. (Powell 1875 in Lowie 1924:27-28)

Ray (1933), however, in discussing the Sanpoil and Nespelem, described another behavioral set that resulted in "heat-treated" projectile points:

> Arrow points were never poisoned. However, many devices were used to increase their potential power. Points were often buried in the ashes beneath the camp fire, deep enough to avoid fracturing,

> and permitted to remain there for several days. When removed the color usually was somewhat changed. They were capable of "burning their way right through deer" (Ray 1933:90).

Now we have two behavioral sets that will produce a "heat-treated" point. It seems apparent that it is no longer justified to interpret single "heat-treated" artifacts as evidence of heat modification of raw materials intended to increase workability.

The value of the ethnographic record in presenting unexpected interpretations/functions for "well known" artifacts is further exemplified by Teit's description of the use of the haft element of projectile points as decorating tools: "Many bone objects are decorated with small circles. These were made with a notched point made of bone, preferably that of bear, one end of which was placed in the center of the circle, while the other was used to scratch the circular line. When one of the points was blunt, a circle without a central dot was produced" (Teit 1900:183). Teit's description can also be applied to any notched stone projectile point.

This description prompts several interesting questions: What kind of wear patterns would this type of use produce? What kind of breakage patterns would be associated with this type of use? Would the bases of "broken points" be curated for use as compass decorators? Could this type of use affect a cultural preference for side- or corner-notched points—or the depth and/or width of either type of notching? The questions generated by this one simple example lead us to the second important value of ethnographic analogy.

3.2.3 The Contrastive Approach

The ethnographic data base is an important source of hypotheses that are relatively free of ethnocentric bias (Gould 1980). The approach taken in this report is that labeled by Gould as the contrastive approach in ethnoarcheology. The basis of the contrastive approach is that the ethnographic data base is used to formulate model(s) of prehistoric lifeways. Disparities between the model and the patterning of material culture remains are noted. These disparities must be explained. The point of formulating a model is that the model can be tested via explicit hypotheses. This approach is based on the explicit rejection of the notion that description of an ethnographic analogue constitutes explanation. Rather, the analogue provides the basis on which a testable hypothesis may be formulated. There are two advantages to this approach. First, it systematizes the use of the ethnographic record and, second, the documentation of patterned disparities between the ethnographic record and its prehistoric concomitants focuses research on systematic appraisals of the nature of culture change.

3.3 The Ethnographic Data Base and Site Formation Processes

We regard our use of ethnographic analogy to be wholly of the discontinuous type. As noted earlier, we reviewed ethnographic materials from the Northwestern Plains, Great Basin, and Plateau Culture Areas. All three areas were subjected to rapid and profound changes associated with the introduction of the horse (Ewers 1955). Thus, we fully anticipated that patterned disparities would occur between the archeological and ethnographic records for the Butte District. Many of these may be attributed to an increase in human mobility via the horse and the economic constraints imposed on a population that becomes dependent on a domesticated herbivore.

The following sections review the material culture and subsistence activities by various groups known to have inhabited the District. When possible, these are tied into site-formation processes.

3.3.1 Tools

Chipped Stone. Chipped stone items are discussed in most detail since they are the most common type of artifact encountered by the archeologist. Further, we shall quote extensively from the ethnographic record since the relevant passages are widely dispersed and sources are often difficult to obtain.

Several types of flaked stone artifacts were recorded in sufficient detail to be of interest here: scrapers/teshoas, drills, knives, spokeshaves/shaft straighteners, and projectile points. According to Teit's description of the Thompson, hunting arrows were leaf-shaped and war arrows barbed (1900:231); Schaeffer's field notes indicate that rounded-shouldered points were used for war by the Kutenai and that flint points were not used by this group for target practice because they "broke too easily" (1935:IV-43, IX-17). Lowie, when describing Northern Shoshone point manufacture, documented a variation in form based on the hunting vs. war distinction:

> . . . the points were about three-quarters of an inch long, half an inch wide and rather thin. According to Wyeth, those intended for hunting were widened, so that the head might be withdrawn with the shaft, while arrows for war lacked this feature (1909:173).

Teit (1900), Lowie (1909), and Jenness (1960) all reported the use of poisoned arrows in the area. As noted earlier, Teit reported use of the haft element of points as decorating tools, and Grinnell their use as hair ornaments. Ewers documented the use of projectile points in Blackfoot medicine bundles (1958:143).

Spokeshaves/arrow shaft straighteners recorded include "a stone flake set in a curved cut in the middle of a stick" (Wissler 1910:83), arrow straighteners made from two pieces of stone, each piece cut in a semi-circular groove (Turney-High 1941; Schaeffer 1934/5?), and a kind of wrench made by boring a hole in a piece of "boss rib" was used by the Blackfoot to straighten arrow shafts (Wissler 1910:83).

Knives were made by the Northern Shoshone:

> by breaking pieces of obsidian . . . and selecting suitable sharp-edged fragments, often of irregular shape. A piece an inch or two long was not rejected so long as it would cut. The edge was renewed by means of an elk or deer horn. Sometimes a wooden or horn handle was attached, but this was frequently lacking (Lowie 1909:173)

Wissler illustrated a Blackfoot knife which is 8 cm long (1910:40). It would be classified by a lithic analyst as a biface with non-patterned overall flaking. There is no indication of marginal retouch in the illustration. Malouf in 1966 published an article describing a Blackfoot manufacturing a semi-lunar knife of slate. The lithic worker used direct and indirect percussion, and the tool was used by contemporary Blackfoot as a hide scraper.

Lowie's description of Shoshone flintworking parallels that of Powell (Section 3.2.2) in that both indicated that pressure flaking tools were made of antler. This was also borne out by Teit's description of stone work among the Thompson:

> The bowlder was split by being laid on a stone and struck with a hand-hammer, generally a pebble of handy size. When a suitable piece had been obtained, its edges were trimmed off with a hard stone. Then it was wrapped in grass or hay placed on edge on a stone, and large flakes were split off with a hand hammer. After a suitable piece had been obtained, it was placed on a pad in the left hand and held in position with the fingers. It was given its final shape by means of a flaker made of antler . . ., which was used with a forward and downward pressure. The blunt point served for flaking off larger chips, while the smaller one was used for the final stages of the work (1900:182, a two-tined flaker is illustrated on page 182).

Further similarities between Teit's and Powell's descriptions include the use of padding to protect the rock knocker's hand and the two-stage reduction process.

Teit illustrated a stone "knife" produced by the described technique (1900:182). A lithic analyst would describe it as an interior percussion flake with marginal bifacial retouch on one edge. It is highly doubtful that a contemporary archeologist would classify the illustrated "knife" as a formal tool. Further, he would be unlikely to look for evidence of hafting on a "modified/utilized flake." However, in the next illustration, Teit indicated that the "knife" in question was hafted.

> Stone knives and stone chisels were hafted in wooden handles by being placed in a slit which was filled with gum. Then a lashing was applied around the wood. They were also hafted in antler. The piece of

> antler was boiled, so as to make it soft. Then the stone blade was driven into its end. When cooling and drying, the antler became very hard, and held the blade firmly, so that no lashing and gum were required to hold it in place (1900:391).

Turney-High provided the final description of the stone-working process. This particular description is unique because of its emphasis on the use of animal fat by the stone worker to modify the workability of the stone.

> The flint quarry near Missoula was mentioned in connection with arrowpoints. The Upper Kutenai also used one in Canada near Fernie which they said was better. . . A flint worker carried to the quarry a good supply of beargrease which was carefully hoarded in an elk's paunch which had been pulled and stretched until it would hold about a gallon. As soon as the worker had chosen a suitable lump of flint, he rubbed it thoroughly with beargrease. "This was to make it crack the way you want it to" (A. Bull Robe). He then gave the nodule a smart blow with a maul. Chips would fly off in various sizes and shapes. The workman carefully examined these blanks, decided which of the accidental forms most closely resembled the various tools or weapons he wished to make and discarded the rest.
>
> He then greased a chosen piece and made an artifact by percussion, delivering the blow away from his person towards the piece of flint . . . Bull Robe insists that the edges of arrow points were likewise improved with a whetstone . . .
>
> The Kutenai preferred going to the quarries and digging for their flint, claiming that surface flint was too brittle to work well. Mined flint, of course, still contains some of the water of crystallization and is softer and more workable. This was the virtue they sought to enhance with bear fat (1941:87-88).

The term "scraper," when used by archeologists, can mean everything from a finished patterned uniface ("end scraper," "side scraper," and so on) to a flake that may or may not exhibit marginal unifacial retouch. The few explicit references in the ethnographic literature refer to the less formal end of this continuum:

> most skin-scrapers were simply thin pieces flaked off from pebbles of various kinds, and were slightly chipped on one edge only . . . (Teit 1906:203)
>
> . . . stone scrapers consisting of thin segments of quartzite, made by striking the rock a smart blow . . . were circular or oval, sharp edged, convex on one side and flat on the other . . . (hide) scraper is either the elk-horn adze of the plains, or a small elliptical sharp-edged stone (Lowie 1909:175-176).

Wissler (1910:Plate 1) showed a woman preparing a hide with a "stone scraper." The tool pictured is either a split cobble or a very large spall or flake larger than the woman's hand. Further, he indicated that in the historic period the Blackfoot preferred the "split-pebble scraper" to the metal knife for working deer skin since metal cut too many holes in the hide. In this case, the illustrated scraper was being used to remove hair from the hide. The tool is 11 cm in length and no marginal retouch is shown on the pebble (Wissler 1910:43, 69).

Spinden noted two types of scrapers used by the Nez Perce. "Scrapers are usually irregular in shape, many are flat on one side and somewhat domed on the other, with a straight scraping edge. Such a scraper was used in the tool for graining skins . . . For another stage of skin dressing a rough scraper was made by simply striking off a disk-shaped fragment from a river boulder" (1908:185). It appears that the former type of scraper was hafted. Wissler illustrated what may be a formal/patterned scraper hafted for use as an adze/flesher (1910:69).

It appears that the most commonly used scraper is the ubiquitous "teshoa." Eyman attributed the production, via a cobble-technology, and use of teshoas to females (1968). One further interpretation of the function of informal scrapers and/or teshoas should be noted. Knudson (1983:iii) reported that modern stone workers casually pick up a coarse cobble spall and use it to scrub edges in platform preparation. These artifacts, according to Knudson, are identical to the "teshoas" found at the MacHaffie site (24JF4).

Only one specific mention was found of chipped stone drills: "stone drills were made of a glassy basalt, which was flaked like the arrowheads. They were hafted in handles made of antler or wood" (Teit 1900:391). Chipped/ "notched"/grooved stone net sinkers were reported for the Kalispel (Ray 1942) and the Kutenai (Turney-High

1941). It should be noted that, in the case of the Kutenai, the nets were used to take waterfowl as well as fish (Schaeffer 1935).

Several accounts are available about who made tools. According to Kroeber, when an Arapaho wanted arrows, he accumulated the necessary materials and then invited several old men to his lodge. The men worked together all day, one man working the points, one feathering the shafts, and so on (1902:24). Spinden indicated that, among the Nez Perce, men made all chipped stone items, while females made all ground stone items (1908:185). Ewers stated that a Blackfoot man made his own stone tools or employed a more skillful elderly man (1958:14). Teit indicated that, in the Flathead/Interior Salish groups, men made all of the weapons and "most of the tools" (1927-28:326).

Ground Stone. Ground/pecked stone mortars and pestles were reported for the Shoshone (Lowie 1909). The Coeur D'Alene used a circular or funnel-shaped basket (without a bottom) placed on a flat rock as a mortar (Teit 1927-28), as did the Nez Perce (Spinden 1908) and the Thompson (Teit 1900). Wooden as well as stone mortars are reported from the Flathead Group (Flathead, Pend D'Oreille, Kalispel, Spokane, Semteuse, and Tunaxa) by Teit (1927-28) and for the Nez Perce (Spinden 1908). Spinden noted further that "the time and labor required to make good pestles rendered them valuable family property, and they were handed down for generations" (1908:185). Schaeffer indicated the use of a more casual type of pestle "for pounding berries a flat rock slab, placed upon an old lodge cover was used. The pounder was made of a roughly shaped river rock" (1934-5?:95). In another volume of his field notes, Schaeffer indicated that one slab/mortar was 7.5" long and 1" thick and the associated pestle/pounder was 4.5" x 2" at the base and 1" at the top (1934:14).

In the archeological literature, ground stone mortars and pestles have been interpreted as evidence of "Basin influence," e.g., Foor (1982), "Plateau influence", e.g., Malouf (1962), and evidence of seasonality (summer sites), e.g., Arthur (1968) and Davis (1963), and as hallmarks of a shift to an archaic/foraging adaptation (Frison 1978). The ethnographic record indicates that ground stone mortars and pestles are just one variety of a larger class of tools which includes basketry mortars, wooden pestles, and unmodified stone mortars and pestles. This class of tools was used to process plant products, bone, mineral pigments, or anything modified by grinding. Those archeologists who interpret ground stone mortars and pestles as evidence of "Outside Influences," seasonality, and/or a foraging adaptation generally ignore the possibility of mortars and pestles made of other materials and assume that their function was that of plant processing.

Brief, often elliptic mentions of other stone tools in the ethnographic record include:

1. the carving of stone with "quartz crystals" (Thompson: Teit 1900)
2. water-worn egg-shaped pebbles used as tops for games on ice, illustrated: length 8 cm, 15 cm in transverse diameter (Blackfoot: Wissler and Duvall 1908:54)
3. egg-shaped stones with a transverse groove used to pound berries and break open bones to get marrow (Blackfoot: Wissler 1910)
4. oddly shaped nodules of flint used in medicine bundles as well as ammonites and sections of baculites to represent buffalo (Blackfoot: Wissler 1912:243)
5. carved soapstone pipes and stone boiling by all groups under review
6. carved soapstone containers (Shoshone: Lowie 1924)
7. stone mallets used to drive elk antler wedges into wood (Flathead Group: Teit 1927-28; Thompson: Teit 1900).

Bone/Antler Tools. Only three distinctive tools of bone and antler were mentioned in the ethnographic record. The use of elk antlers as wedges to remove bark and split wood is described for all groups, including the Shoshone, as is the use of antler or horn flakers in lithic manufacture and a serrated/toothed elk or bear metapodial fleshing tool. Teit (1900) noted a bone netting tool used by the Thompson. The one illustrated is approximately 10 cm long with incurvate sides and is 4 cm wide at its center and 7 cm wide at each end. According to Teit, this tool was used as a template to ensure that sections of netting were of equal size. Presumably, not all nets had the same sectional dimensions, so this tool would come in variable sizes. These netting tools were occasionally carved out of soft green stone (soapstone? or argillite?) (1900:183 and Figure 125).

We found only one use of modified human bone among groups in the area. "Flathead sharpers manufactured stick game bones from the humerus of man. They believed that if the human humerus were used, it would numb the hand of the opponent and betray which hand held the bone" (Weisel 1952:351).

Ceramics. Pottery has been attributed to the Shoshone (Lowie 1909), Kutenai (Schaeffer 1934-35?), and Blackfoot (Wissler 1912; Lewis 1942; Ewers 1945). In all cases, the pottery was described as flat-bottomed, cylindrical in shape, nearly perpendicular sided, thick walled, and probably moulded or modeled, i.e., it falls within the range of variation for what is known archeologically as the Intermountain Tradition. Intermountain pottery is most often assumed to be associated with Shoshoneans, e.g., Frison (1978).

Generally, the possibility of this pottery being associated with either of the more northerly groups has been ignored by archeologists working in the Butte District. Presumably, this results from the very limited documentation of pottery among the Kutenai and Blackfoot. There is no extant example of either Kutenai or Blackfoot pottery. All evidence is ethnographic. Generally, the ethnographic descriptions are ignored or reqarded as unreliable, especially by those archeologists familiar only with ceramic taxonomies and not with ceramic technologies. Simon (1979) has replicated the pottery associated with the Blackfoot and Kutenai, using techniques described in the ethnographic literature. She found all described techniques to be viable. Therefore, it seems reasonable to at least consider the option of looking more closely at the Intermountain Tradition and to describe the range of variation found within this tradition. Eventually, it may be possible to isolate variants that can be used to discriminate between the three pottery-making groups or to possibly reject the northerly groups as systematic, habitual potters.

One final note on ceramic items is that Wissler reported that clay modeled toys and pipes (unfired) were made by the Blackfoot (Wissler 1910:83).

3.3.2 Tools: Archeological Implications

Several points can be derived from this review of the ethnographic record. In terms of stone tools, three points can be made. First, the form of projectile points appears to vary with function. Traditionally, archeologists have ascribed temporal significance to variation in projectile point styles. The ethnographic record indicates that other sources of variation include intended use, e.g., hunting vs. war. Material type selection may have symbolic components as well as availability and workability components. Boas (1918) indicated that the Kutenai recognize two classes of stone, *tuwukxonol* and *Aacqa'tsko*, which he classified as diorite and flint, respectively. This suggests one way in which the symbolic attributes of stone might be addressed. Systematic study of the lithic vocabularies of the various groups reviewed here could lead to some interesting hypotheses related to material type selection. Ames and Marshall (1980) have shown how profitable this type of linguistic inquiry can be to archeology. They explicated the Nez Perce settlement pattern via the Nez Perce's own labeling systems for camps. Their approach led them to a new model of Plateau siting decisions. Perhaps this research tactic could lead to a clarification of the relationship between material type and tool or point type in the Butte District. Swanson's (1972) seriation of projectile point styles in the Birch Creek area, which documented the coterminous use of a variety of styles, may be an indication of the multiple factors involved in projectile point styles, as perhaps can also be seen in Roll's documentation of Avonlea points in a non-Plains context (1982).

We see no way to test the attribution of particular point styles to particular ethnic groups at this time. Appendix IV contains several illustrations of typical point styles for the Plateau, Plains, and Basin areas during comparable ages. These drawings indicate substantial overlap of the ranges of variation for point styles in the different Culture Areas. The range of variation for Harder, Pelican Lake, and Elko Corner Notched points is so great that most examples of any of the three could fit into any of the others. Future work with large samples from secure, excavated contexts may enable the isolation of metric attributes that correlate with particular point styles, but it is unlikely that isolated surface points recovered to date in the District will contribute to this approach. For this reason, we regard the postulated Plains/Basin/Plateau influences on the basis of point types as a moot question at this time.

Second, technological strategies for the production of stone tools are known to crosscut ethnic boundaries. This suggests that the availability and qualities of particular material types may have overriding significance in explaining variations in form (cf. Zeier 1975).

Third, "casual" or "informal" stone tools (as opposed to finished patterned tools) which would most often be classified by modern lithic technologists as modified/utilized flakes, appear to have been classified as scrapers, knives, and so on by those who used them. This third point suggests that archeologists should pay more attention to this category of finds than has been common practice. For example, wear-analysis is most often restricted to formal patterned tools and modified/utilized flakes are not even examined for indications of use wear. One consequence of this oversight is that lithic analysts are systematically ignoring one subset of tools. As a result, their characterization of a group's tool kit will not be representative.

Chipped stone tools, as described in the ethnographic record, represent two ends of a continuum. Projectile points, drills, and perhaps patterned scrapers are small, high-energy investment tools. We suggest that this type of tool was intended to be used repeatedly or curated for symbolic reasons and therefore is the least frequently found in situations of loss or discard. The more casual or immediate use and discard tools (low-energy investment), i.e., those things most often classified by archeologists as debitage or modified/utilized flakes, may be the most sensitive indicators of site function/activities. This suggests that wear analysis studies could profitably be directed toward debitage/flakes. A corollary of this approach is that testing hypotheses concerning site function would require the systematic, detailed examination of the flake or debitage class of lithic artifacts.

As noted in our description of ground stone tools, traditionally archeologists working in western Montana have inferred various directions of influence from material items such as mortars and pestles. This same pattern holds in the interpretation of pottery. Mortars and pestles have also commonly been used as "indicators" of an Archaic adaptation, which in turn has been associated with the "mountains-as-refuge" hypothesis (Frison 1978). In other words, milling stones have been used like projectile point styles as a form of chronological marker as well as an indicator of ethnicity. In the case of mortars and pestles, the putative Archaic shift is not only supposed to correlate with a particular temporal/climatic period (the Altithermal), but it is also seen as an indicator or marker of "Plains" influence. The competing paradigm in western Montana archeology is that of in situ development. Followers of this school of thought are the ones most likely to interpret putative plant processing tools as evidence of seasonality. It is our position that, while at some level either or both of these interpretations may be correct, neither has yet been tested.

Both ground stone tools and pottery are high-energy investment, low-portability artifacts. The distribution of flat-bottomed ceramics in the District apparently parallels that of ground stone tools, i.e., it is much more common in the southwestern part (Malouf 1957; Arthur 1966; Napton 1966). This suggests that populations in the southwestern part of the District were less mobile and hence tended to invest more heavily in items that were difficult to transport, or that resources in the southwestern part of the District tended to be more predictable and recurrent in terms of locality and sufficiently dense that mobile populations scheduled recurrent seasonal use of the same localities and cached (purposefully discarded for later reuse) non-portable items of material culture.

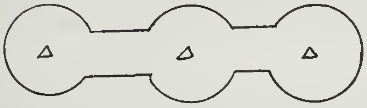
Tools found in sites are there as a result of accidental or purposeful discard behavior. Archaeology is always confronted with the sampling paradox—the inability to know the degree to which any "sample" accurately represents the population from which it is drawn. Therefore, testable hypotheses about material culture items must be independent of reliance on the proportional composition of an assemblage(s) (Ebert 1979). For example, the apparent preponderance of milling stones in sites in southwestern Montana is neither necessary nor sufficient evidence for Shoshonean influence or increased emphasis on plant processing (an Archaic adaptation) or seasonality. The ethnographic record documents the use of basketry mortars, cobble pounders, or pestles, which indicates that the archeological sample of "plant processing" tools, i.e., ground stone mortars and pestles, is indeed non-representative. We do not necessarily question the distribution of ground stone mortars and pestles. Rather we suggest that this distribution is tied to either the relative mobility of the populations using different parts of the area or the relative strictness of scheduling the seasonal round in the area. The apparent parallel between the distribution of two classes of high-energy investment, low-portability artifacts (ceramics and ground stone) suggests that this is a reasonable avenue to explore.

The first step in testing this idea is to discover whether indeed there is a higher density of sites containing either or both ceramics and ground stone in the southwestern part of western Montana. Unfortunately, our sample of 793 sites on BLM land (cf. Part V) contains insufficient data to address this question. If, however, such can be documented in the future, then a logical next step would be to test the following hypothesis: There is no correlation between multi-occupation sites and the distribution of ceramics and/or pottery. If this hypothesis were rejected, it would suggest that the distribution of either or both of these artifact classes is tied to caching behavior.

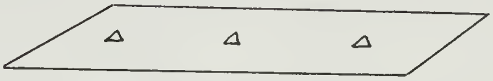
3.3.3 Housing Patterns and Their Archeological Implications

Three basic types of habitation structures were used by ethnohistoric inhabitants of the Butte District: the conical mat/brush/pole/bark lodge, the longlodge, and the tipi. Only the longlodge, was a multi-family dwelling. Both types of conical lodges were generally nuclear family dwellings. Grinnell (1962) did document one important exception to this among the Blackfoot. He described a multi-family dwelling that was essentially three tipis joined by what can functionally be described as a hallway (A). When this was compared to the floor plan of the Plateau longlodge (B) which is essentially a double lean-to formed by bipods, their morphological similarity became apparent.

A



B



This similarity may be a function of contact/influence or simply parallel solutions to a similar problem made by peoples with comparable technologies. On morphological grounds, at any rate, it seems legitimate to treat this three-part architectural system as a unit.

In terms of site-formation processes, three possible subjects were considered: stone rings, house pits, and perhaps physical/chemical analysis to detect differential organic debris in forest soils. An extensive and intensive survey of Northwestern Plains architectural systems was undertaken previously in the context of the Northern Border Pipeline project (S. Deaver 1983). However, no significant variants of tipi use were found in the ethnographic review for this project. Therefore, we shall simply summarize the ethnographically derived model for the interpretation of tipi rings that was formulated on that project.

The following model makes systematic population estimates on the basis of number and size of tipi rings in a site. These population estimates are then related to the estimated house weight, derived again from the number and size of stone rings in a site, in order to calculate the minimal amount of energy required for site occupants to move their camp.

Ekistics, an international architectural school emphasizing the development of housing for the poor (Doxiadus 1976), postulates a cross-cultural minimal person bubble of 4.08 m^2. Narrol (1962) has postulated a minimal person bubble of 10 m^2, which is too large for a nomadic society in which tents become private space and the space between dwellings becomes everyday living space (Wissner 1974). Use of Wissner's mathematical model for deriving population estimates suggested 40 people per 4.5 m diameter tipi, which is unacceptable based on the ethnographic record where 6-8 individuals per "average" tipi was normative (Ewers 1958). Therefore, we used an ekistics base to derive population size. The number of people per structure equals floor area divided by 4.08 m^2. The total number of stone rings and their diameters (which allows for the calculation of floor area) and, hence, associated people provides an approximation of population size. The total housing weight divided by the number of people per stone ring will, in turn, yield the housing load per person, which provides a measure of how difficult in terms of energy cost it would be to move camp (S. Deaver 1983).

Stone rings with diameters of more than 3.5 m and less than 6.5 m most likely represent habitation structures. The number of poles a particular tipi required can be calculated using the following formula: 1.04 x m circumference + 2. Pole weight equals pole length x 1.04 kg/m of pole (for lodge pole pine). Pole length is a function of tipi diameter and can be calculated as diameter + 1.21 m. The minimal number of bison hides needed to make the cover may be calculated by dividing the surface area of the cone by 4.25 m^2. The number of hides times 4.8 kg will yield the weight of the hides. The combined weight of the poles and hides can thus be derived once the diameter of the stone ring is known. Hence, the housing weight or transportation cost in kilograms can be calculated for occupants of the site. This, of course, assumes that the archeologist can determine the contemporaneity or non-contemporaneity of features at the site (S. Deaver 1983).

The most significant intervening variables in calculating transportation costs are whether dogs and/or horses were used as pack animals and whether or not the site was situated in timber. The mean weight of travois loads pulled by dogs is 41.2 kg (S. Deaver 1983). If the site is Pre-horse, then housing weight divided by 41.2 kg will yield the minimal number of dogs required to move camp. Dogs dragging a travois holding a cover of 6-8 hides can travel 8 to 9.7 km/day (Ewers 1958). Extrapolators should note, however, that this interpolated number of dogs did not take puppies, dogs kept exclusively as breeding stock, pets, and hunting dogs into acount. Teit (1927-28) indicated that the Plateau Salish did not use dogs as draft animals. Schaeffer indicated that the Kutenai used dogs to carry packs, but never to pull travois, and that one family usually had seven dogs (Schaeffer 1935).

If the site was in a timbered area, the poles may have simply been left, thus reducing housing/transportation cost to the weight of the hides. Stone rings occur where rocks are abundant, or where the soil is too hard (frozen in winter), or the site surface may have restricted the use of tent pegs. If the site is Post-horse and horses are used exclusively to move housing, then the minimal number of horses required to move camp can be calculated by dividing the number of habitation-size stone rings by 2—one horse carried the poles and one the cover (Ewers 1958). Again, extrapolators should note that that does not take into account any non-working horses or those reserved for other purposes.

Applying this model to a single stone ring (4.5 m diameter) site yields a population estimate of 5-6 people having to move 141 kg of housing weight, assuming they had to move both the poles and the hides. Depending on the temporal affiliation, this housing weight could have been moved by four dogs and/or two horses. The use of this model is dependent upon the diameter of all stone rings in a site being recorded and the archeologist being able to discriminate between occupation events at multi-occupation sites.

Conical mat/brush/bark/pole lodges and longlodges may, on occasion, be evidenced in the District by house pits, circular in the former and oblong with rounded or straight ends in the latter. These types of habitations were excavated to various depths depending on the looseness of the soil and the intended permanency of the structure. Generally, these house pits were dug only in winter sites. The same house forms were used in the summer, especially the conical lodge, but they were placed on ground surface and hence no pits were excavated in the sites (Teit 1900, 1927-28; Spinden 1908; Ray 1933, 1939, 1942; Fuller 1974; Schaeffer 1934-35?). Covering materials were acquired on the site except when mats were used. Thus, housing/transportation costs would be minimal. However, set-up time may have been significant or may have required group effort. In the case of winter long lodges, excavation costs may have been significant. Mats were used and reused at various housing sites and for other purposes, e.g., drying berries (Schaeffer 1934-5?; Teit 1900, 1927-28). Minimal population for a site containing house pits can be calculated by dividing total site floor area by 4.08 m^2. Variation in structure sizes reported in the ethnographic record are summarized in Table 4. Mat weights are not available.

While stone rings are commonly reported in the District and are relatively easy to detect on the surface, pits have only occasionally been reported and have been ascribed several different functions including house floors, hunting blinds, and eagle catching and battle pits (e.g., Malouf 1963). According to the ethnographic record, house pits should exhibit a central hearth or hearths depending on whether the pit represents a single- or a multiple-family dwelling. Thus, the presence or absence of internal hearths provides one avenue for differentiating the housing generated pits.

The detection of pegged tipis and summer conical and longlodges is extremely difficult if not currently impossible. A physical/chemical technique for detecting differential organic debris in various soil types is probably the only hope for detecting such structures and even then only those that were abandoned rather than dismantled could be detected. Perhaps differential artifact densities can be used to discover these types of habitation structures, but there is no clear evidence of this in the ethnographic record.

The internal use of space in these habitation structures was only briefly mentioned in the ethnographic record. Miller indicated that, among the Kutenai, men used the honor/right side of the tipi while females used the left/harmless side (1982). The Blackfoot, according to Ewers, Wissler, and Grinnell, regarded the interior as private

Table 4. Sizes of Longlodges and Conical Mat/Brush/Bark/Timber Lodges

	Size	Depth Excavated	Group	Reference
		Longlodges		
1.	no dimensions 6 families, 3 fires	0.3 m	Flathead Group	Teit 1927-28
2.	no dimensions 3-4 families	no data	Thompson	Teit 1900
3.	150 ft long	0.6-0.9 m	Nez Perce	Lewis and Clark in Spinden 1908
4.	20-70 ft long	no data	Nez Perce	Corp in Spinden 1908
5.	30-50 m long	35-75 cm	Coeur D'Alene	Teit 1927-28
		Conical Lodges		
1.	Diameter 5-10 m	no data	Coeur D'Alene	Teit 1927-28
2.	Diameter 6.096 m	1.5-1.8 m	Nez Perce	Spinden 1908
3.	Diameter 3.65 m	no data	Sanpoil/Nespelem	Ray 1933
4.	Diameter 5-15 m	no data	Lillooet	Teit 1906

family space. The area opposite the door was controlled by the male head of the household, and the entire inner circumference was used to store various items.

Siting Decisions. Spatial arrangement of housing structures within a camp is rarely mentioned in the ethnographic record. Lewis (1942) suggested that Pre-horse Blackfoot camped in parallel lines, while Post-horse formed a camp circle. He ascribed this difference to changes in raiding patterns associated with introduction of the horse.

Camp placement seems to have been a product of resource availability (plant, fish, water, and wood), the looseness of the soil in the case of winter camps, and the manipulation of proximity to affect social relationships between different groups (Spinden 1908; Teit 1927-28; Schaeffer 1934-35?; Ray 1933). Teit (1900, 1906, 1927-28), Schaeffer (1934-35?), Spinden (1908), and Ray (1933, 1939) all have indicated that especially favored winter localities were used repeatedly, although often by different groups of individuals, and that caches were maintained in these localities for multi-year periods.

Specific hypotheses suggested by the ethnographic record, which can be tested on Butte District sites, include:

1. There is a random distribution between multi-occupation habitation sites and the diversity of resources available;

2. There is a random distribution between stability/predictability of resources and multi-occupation habitation sites;

3. There is a random distribution between large feature (number of stone ring or habitation generated pits) sites and diversity and/or stability and/or diversity of resources;

4. There is no correlation between habitation site size (number of features) and repeated occupation events; and

5. There is a random distribution of artifacts within, between, and among habitation structures.

3.3.4 Subsistence Activities and Their Archeological Implications

Most ethnographers have dealt with subsistence activities by listing species exploited and describing an idealized seasonal round. All groups reviewed for this project were known to exploit a diversity of roots, berries, bark, seeds, and animals. The most impressive thing about the species list is the diversity. Unfortunately, almost no quantitative data were given on amounts collected, how often particular species were utilized, or with what regularity. Items like deer or camas are occasionally glossed as staples, but no figures at all are available for calculating what percentage of the diet a particular resource constituted for any group. Turney-High mentioned that 12 kg of pine tree lichen were stored in one season, but did not indicate whether this amount was in some sense the normal amount or to what size group it referred (1937). Malouf indicated that a family used 24-32 kg of bitterroot over a year. He further documented that this resource was used basically as a condiment (1974:129). Schaeffer's field notes state that a Kutenai family stored over 48 kg of bitterroot as a year's supply (1934 I:50). Ray recorded that, among the Sanpoil and Nespelem, each woman could dig 2 ha of camas a day (about 0.35 hl) and that she could accumulate the family's yearly supply in 30-40 days (1933:98).

The only other quantitative data related to resource exploitation in the District concerns non-food resources. Schaeffer's field notes indicate that the Kutenai needed two elk hides to make a canoe (1934), and Lewis indicated that, once the Blackfoot were tied into the fur trading economy, polygny was the basis for an economy, of scale in hide processing. One woman working alone could process 10 hides/year, whereas, as part of an eight co-wife work group, she could average 18.75 hides/year (1942:39).

The particular species available in the study area were discussed in Part II and need not be repeated here. Exploitation of any particular sub-set of species by populations using the District will be a function of resource availability, density/productivity, and predictability (cf. Thomas 1972; Jochim 1979). Given the mosaic nature of the environment, the high resource diversity and concomitant low density, we anticipate that subsistence activities will include allocating substantial time and energy to monitoring when and where specific resources will become available (cf. Kelley 1983). The more predictable the resource, the lower the monitoring cost. Thus, we suggest that camas meadows, fish runs, and game trails would have been heavily utilized. There is scattered ethnographic data which supports this idea as being at least reasonable.

There are several measures of relative dependence upon a food resource. Two that can be documented in the ethnographic record are (1) manipulation of a species and/or its habitat to increase productivity and (2) increasing the efficiency of the harvest technology (cf. A. Kehoe 1981). Productivity can be increased in many different ways. Teit (1900, 1927-28), Schaeffer (1934) and Turney-High (1937) recorded the use of trained dogs to increase the efficiency of hunting deer, elk, and bear by various Plateau peoples. Lowie (1924) reported the use of hunting dogs in the harvesting of prairie dogs, rabbits, and mountain sheep by the Northern Shoshone. Hellson and Gadd (1974) reported Blackfoot women robbing rodent caches for plant materials, as did Teit (1900, 1927-28) for various Plateau groups. The practice of controlled burning to increase the productivity of gathering meadows and to drive deer into traps was reported by Teit (1900, 1927-28) and Schaeffer (1934). Prince Maximilian reported that, in the early 1800s, the Blackfoot were engaging in herd management techniques which included burning the prairie to ensure good grass for the herds and gelding and releasing young bison (Thwaites 1966a). Finally, Teit reported the purposeful transplanting of trout from one lake to another (1900:333).

Elaborations of the harvesting technologies documented in the ethnographic record are summarized below. The reader should note that these specific tactics can be subsumed under three basic strategies: (1) group cooperation, (2) focusing on gregarious species (herds of mammals, schools or runs of fish, and flocks of fowl), and (3) using detailed knowledge of the sought species and particular localities.

Specific tactics for increasing efficiency of the harvest technology recorded include:

1. bison driving and impounding (Wissler 1910; Turney-High 1937; Ewers 1958),
2. scheduling by headmen to ensure maximization of diverse resources (Turney-High 1941; Teit 1927-28),
3. antelope drives (Grinnell 1962; Lowie 1924; Madson 1958; Murphy and Murphy 1960); deer drives using fire, especially during the whitetail fawning season (Schaeffer 1935),

4. driving game into snow drifts, lakes, and through funnel fences set up on game trails (Schaeffer 1934-35?; Ray 1939),

5. screen traps erected in the center of a dam of willow poles extending across a stream . . . drive fish into trap with willow scoop . . . tunnel shaped fish traps especially for whitefish and bull trout (Schaeffer 1934-35?; Wissler 1910), and

6. netting waterfowl from canoes (Schaeffer 1935).

The idealized seasonal rounds reported for the groups utilizing the District during the ethnographic period were heavily influenced by introduction of the horse. The increased mobility afforded by the horse allowed people the option of movement over distances that were not possible for pedestrian hunters and gatherers. When we examined the calendrical cycle of subsistence activities of the various groups, several regularities were noted. Spring activities noted include collection of duck eggs, antelope drives, individual hunting of deer and elk by the Blackfoot (Grinnell 1962); Kutenai use of fire drives for hunting whitetails during fawning (Schaeffer 1934-35?); Flathead and Blackfoot women collecting bitterroot in May and wild carrots in June (Turney-High 1937, Ewers 1958); trapping fish, especially whitefish, by various Salish groups (Teit 1927-28); and gathering of strawberries by the Kutenai in May (Schaeffer 1935). Summer activities involved the digging of roots, especially camas, lomatium, and *Psoralea esculenta* (Wissler 1910; Teit 1927-28; Turney-High 1941). Hunting activities, other than for bison, seemed to be individually organized, as was fishing. In late summer, the emphasis was on collecting berries and individualized hunting and fishing. In the fall, communal hunting became important again and chokecherries and buffaloberries were collected (Schaeffer 1934, 1935; Teit 1927-28). Also in this period, wintering sites were selected and prepared, i.e., house and storage pits were excavated. Pedestrian nomads were quite likely immobilized much of the winter, but the hunting of deer, wapiti, and mountain sheep is recorded for various groups using snowshoes and immobilizing animals by driving them into snowdrifts (Teit 1927-28; Turney-High 1937; Schaeffer 1934).

It is most difficult to derive specific testable hypotheses from the ethnographic record relative to subsistence activities because of several factors. First, there is a dearth of specific quantitative ecological information in the ethnographic record. Second, the influence of the horse limits severely the applicability of the seasonal rounds recorded. Third, the mosaic nature of the environment, coupled with the wide diversity of species, prohibits any District-wide correlation with seasonality. The availability and exploitation of gregarious species could lead to periodic aggregation of human populations and hence larger sites, as would a high level of predictability of specific resources in particular localities. Hence, we suggest the following specific hypotheses for testing using Butte District sites:

1. There is no relationship between the availability of gregarious species and site size.

2. There is a random distribution between non-mobile resources and multi-occupation sites; and

3. There is a random distribution of game trails and trap and blind/pit sites.

One final potential source of hypotheses concerning subsistence should be noted. Steedman (1930), in examining the ethnobotany of the Thompson, noted that Thompson botanical taxonomy classified plants both by their associations, i.e., in terms of which species regularly occur together, and on the basis of habitats in which they occur. If it were possible to discover aboriginal taxonomies of plant and animal resources, some clues regarding macro-siting decisions might be generated.

3.4 Summary

The purpose of this review of the ethnographic data base was twofold. First, the ethnographic record was used to generate methodological cautions by alerting reviewers to alternate explanations for "well-known phenomena." Specifically, we found that single heat-treated artifacts cannot be assumed to indicate that the raw material was heated with the intent of increasing workability of the stone; that there are multiple sources of morphological variability in projectile points which may or may not have temporal significance; and that, by ignoring the flake/debitage class of artifacts, archeologists overlook items that were categorized as tools by the people who made and used them. Further, ground stone tools are a subset of a larger class of grinding tools used to process inorganic as well as organic resources. Explanations of ground stone tool distribution must take into account this larger class of artifacts and its multiple functions. Finally, the ethnographic record indicates that pottery which falls within the range of variation for the Intermountain Tradition may be associated with Shoshoneans, Blackfoot, or Kutenai; thus, the assumed correlation between flat-bottomed pottery and "Basin Influence" needs to be re-examined.

Our second use of the ethnographic record was to formulate specific models of interpretation and testable hypotheses to facilitate future research on Butte District sites. In Section 3.3.3, we presented a mathematical model for generating population estimates for stone ring and house pit sites. These population estimates can be combined with the formulae for deriving housing weights to estimate the difficulty, in terms of energy costs, of moving a particular camp.

Five specific hypotheses which deal with the relationships between habitation sites and siting decisions were enumerated. Further, three specific hypotheses concerning subsistence activities and site size and distribution have been generated. These are all testable on Butte District sites if the necessary environmental and feature size data are systematically recorded.

Thus, the ethnographic record was used here to set parameters for future research. We assume that hypotheses generated by this method will be rejected, validated, modified, and so on, as data warrant. The ethnographic data base has not yielded all it can in terms of testable hypotheses for the Butte District. Two other avenues should be explored further. First, the rest of Claude Schaeffer's field notes should be reviewed by anyone working in the northern half of the District. Second, the sociolinguistics of the various groups who have lived in the District may contain valuable clues for the archeologist who is concerned with how local inhabitants conceptualized their environment and how that affected their use of particular resources.

PART IV. ARCHEOLOGICAL HISTORY OF THE BUTTE DISTRICT

4.1 Introduction

This section reviews and summarizes archeological literature immediately relevant to the District. Emphasis is on the salient archeological models, hypotheses, and research strategies employed by workers in the Butte District. This summary is presented in terms of a periodization which reflects overall trends in American archeology. Major works are reviewed in this chapter, but readers are referred to Appendix III, an annotated bibliography which contains brief descriptions of many other works from each period.

Willey and Sabloff (1974) divided the developmental history of American archeology into four periods: the Speculative period (1492-1840), the Classificatory-Descriptive period (1840-1914), the Classificatory-Historical period, and the Explanatory period. This periodization reflects a gradual professionalization of the field and the development of changing paradigms and aims within the archeological community, as well as changing sociopolitical contexts of archeological reconnaissance and research. All of these factors have influenced the archeological history of the Butte District. Further, since the District spans three ethnographic Culture Areas, major trends in Plateau, Basin, and Plains anthropology are also reflected in District archeology.

4.2 The Speculative Period (1492-1840)

This period in American archeology is characterized by armchair speculation about the origin of the American Indian. Since the Butte District contains no monumental architecture (mounds, pyramids, and so on), little attention was paid to the District specifically in this regard.

Fur trader, explorer, and missionary journals dating from this period do provide ethnohistoric data about groups inhabiting the District. These are commonly used as sources of ethnographic analogy employed to interpret archeological materials. For example, Lewis and Clark provided descriptions of campgrounds, tipis, conical timbered lodges, ceremonial structures, soapstone, and pottery vessels, and so on. Further, they noted that the difficulties of procuring food imposed a hardship on large groups and that smaller, isolated encampments seemed to fare better (Coues 1965). The latter source is often quoted by those archeologists who postulate low population densities in the region.

4.3 The Classificatory-Descriptive Period (1840-1914)

The focus of this period in American archeology was on the description of archeological materials, especially architecture and monuments. Along with this emphasis on description came the earliest attempts at classification. Typologies tended to be based either on the putative function of artifacts/features or on the materials used to make them. This mode of classification was reflected in museum collections of the time which placed pottery from all over the Americas together in one section, baskets in another, and so on. During this period, John Wesley Powell was employed by the Smithsonian Institution and created the Bureau of American Ethnology. Several important scientific expeditions were supported by the Smithsonian, some of which yielded information relevant to the area encompassed by the Butte District. Powell, in 1869-1872, led an expedition to explore the Colorado River and its tributaries. Powell's journals provide detailed descriptions of Basin groups which have been used as sources of ethnographic analogy specifically relevant to the southwestern section of the District (Powell 1875). Teit's (1900, 1906, 1927-28) and Boas' (1890, 1905) early ethnographic accounts of peoples utilizing the northern part of the District were augmented by the Smithsonian Institution and the Bureau of American Ethnology. These earliest ethnographies tend to be more useful to archeologists than later ones because they tend to emphasize the detailed description of material culture.

The first archeological report concerning the District was published in this period. The Little Big Horn River Superintendent, P. W. Norris, published an account of stone piles and flint quarries along the upper Yellowstone drainage. His account includes descriptions of cairns on a quarry near Emigrant (Malouf 1961). In 1908, Professor J. Morton Elrod published photographs of pictographs on a large cliff on the west shore of Flathead Lake, near Rollins (Malouf 1961:7). Essentially, Montana archeology in this period was an avocation that resulted in a few descriptive accounts of particular sites.

In 1914, William Holmes, an important figure in American archeology for his pioneering efforts in the study of pottery types and lithic sources, published "Areas of American Culture Characterization Tentatively Outlined as an Aid in the Study of Antiquities" in the *American Anthropologist.* In this article, Holmes divided North America into geographic regions based primarily on the presence or absence of particular pottery types. The Butte District was placed in Region V—The Great Plains and Rocky Mountains. This article is significant because it exemplifies the growing interest in spatial distribution studies in American archeology and anthropology. More importantly, however, it presaged the development of a major anthropological paradigm which heavily influenced and continues to influence archeology in general and Butte District archeology in particular—the Culture Area concept.

4.4 The Classificatory-Historical Period (1914-1940)

Nationally, during this period, the concern was with developing chronological control. Techniques of seriation and stratigraphic excavation were developed and elaborated. Areal and regional classifications were developed based on elaborate pottery typologies in the south, and the direct historical approach became a critical part of Missouri Valley archeology.

Archeology in Montana in the 1920s and 1930s was dominated by avocational interests. Two finds which exemplify this period in the Butte District were described by Malouf:

> One minor find was made in western Montana during the depression years. A skeleton was found near Lozeau, Montana (near Alberton) in 1934 by Mr. Edward Lozeau. Another find was near Rollins, on the west side of Flathead Lake. These were briefly reported by Dr. Turney-High. These reports of skeletons were mostly descriptive with little or no effort to relate to culture horizons except for the possibility of connecting Lozeau Man with horizons along the Thompson River, in British Columbia. That such a connection existed is indicated by the find of copper objects in the grave . . . (1961:8).

The depression had a significant effect on the development of Montana archeology. In the 1930s, under the auspices of the Montana Archeological Survey and the Work Projects Administration (WPA), excavations at Pictograph Cave were undertaken. Frison has referred to these excavations as "the first systematic work of any consequence (in the Northwest Plains)" (1973:171). Results of the Pictograph Cave excavations formed the basis for William T. Mulloy's doctoral dissertation which was completed in 1957 and published in 1958. Mulloy produced a cultural chronology for the Northwestern Plains which is still generally accepted as valid today: Early period 13,000 B.C. —4,000 B.C., Early Middle period 4,000 B.C. — A.D. 1, Late Middle period A.D. 1 — 500, and Late period A.D. 500-1,800.

Mulloy had earlier reported WPA excavations at the Red Lodge site (near Red Lodge, MT), immediately east of the District. Two hearths, a mano, metate and pestle, and several projectile points (Duncan, Hanna, Pelican Lake, Yuma, and Late Plains Side-notched) were recorded at the site (Mulloy 1943). Mulloy's report did not discuss provenience or stratigraphic relationships among these artifacts.

Two important developments in American anthropology during this period had a significant and continuing influence on the formulation of interpretive frameworks that have been applied to the prehistory of the Butte District. These are the development of the Culture Area concept and Julian Steward's initial formulation of cultural ecology as an explanatory paradigm. The Culture Area concept, as developed by ethnographers Otis T. Mason, Clark Wissler, and Alfred Kroeber, is a heuristic device that has been used to classify North American Indian cultures. The basic assumption of this classification system is that, during the Historic period, groups that lived in the same geographic area tended to share more culture traits with each other than they did with groups outside their geographic region. Kroeber's classification, the scheme that was to have the most lasting influence, put parts of the Butte District into three different Culture Areas: the Great Plains, the Interior Plateau, and the Great Basin (1940) (Figure 10). The latter two Culture Areas were defined primarily in terms of "lacks," i.e., the absence of particular culture traits. This was more a reflection of the state of American ethnology at that time than a representative, accurate picture of the ethnographic groups inhabiting these areas. Thus, large portions of the Butte District were classified as "marginal." Culture Areas, as originally formulated, had no associated time depth. Archeologists habitually, however, have applied culture areas to prehistoric periods. Ewers (1967) tried to combat this particular tendency. This is not to say that there were not regional similarities in prehistory, i.e., horizons, but it cannot be assumed that the boundaries are the same in different periods. This is important to the understanding of Butte District archeology because many of the interpretations and/or explanations of District archeology postulate "Basin influences," "Plains influences," and "Plateau influences" which, of course, are based on the assumption that Historic period Culture Areas extend back into prehistory and that the District was in some sense empty/marginal until other putative Culture Areas influenced it.

In 1938, Julian Steward published *Basin-Plateau Aboriginal Sociopolitical Groups*, a work that was critical to the development of the ecological approach in both anthropology and archeology. Steward's thesis was that the constraints of a particular environment limited/determined "core elements" of the culture found in that environment. These core elements were essentially the technological systems employed by the culture. Two things are important here. First, Steward focuses on societal-environmental relationships. Second, and implicit in this approach, is the notion that culture is seen as an adaptation rather than a concatenation of traits, as in the Culture Area approach. The archeologist of the cultural ecology school is directed to focus his attention on relationships between sites/assemblages/tools and the environmental setting, whereas, under the Culture Area concept, attention focuses on areal contrasts between site types, assemblages, and tool types.

Steward worked directly with archeologists, encouraging them to compare specific cultural sequences in specific environmental settings in order to look for parallels in developmental sequences, i.e., environmentally delimited causes of culture change (Willey and Sabloff 1974). Not surprisingly, the followers of this particular paradigm tend to emphasize in situ developmental sequences limited by the transmontane setting when working in the Butte District. However, it was not until the second half of the Classificatory-Historical period that either of these approaches was explicitly applied to District archeology in any systematic fashion.

4.5 The Classificatory-Historical Period: The Concern with Context and Function (1940-1960)

According to Willey and Sabloff, the second half of the Classificatory-Historical period is characterized by (1) artifacts being understood and studied as products of behavior, (2) a concern with settlement pattern, i.e., putting sites in an areal context, and (3) an emphasis on the relationship between cultural and natural environments. The difference between the first and second part of the Classificatory-Historical period is, according to Willey and Sabloff, a function of the discovery and application of carbon-14 dating. Once use of this absolute dating technique became widespread, archeologists could afford to focus on problems other than chronology.

Treating artifacts as by-products of behavior led to studies of their use and manufacture. Lithic analysis and replication studies were widely elaborated. The focus on settlement pattern led to studies of how populations used different aspects of an environment(s). Site placement modeling and distributional studies became a dominant theme in American archeology. Followers of the "new school" of cultural ecology focused their research on questions of how particular cultures adapted to environmental changes. Coterminous with these developments in the mainstream of American archeology was the collaboration between paleontologists, geologists, and archeologists in documenting early man in North America (Frison 1973).

Avocational interest continued to provide important descriptive contributions to District archeology in this period. Maynard Shumate published accounts of Early period artifacts from the Great Falls area (1950, 1958-1959, 1962); Thain White published descriptions of Kutenai pipes, Kutenai place names, and site descriptions for the Flathead

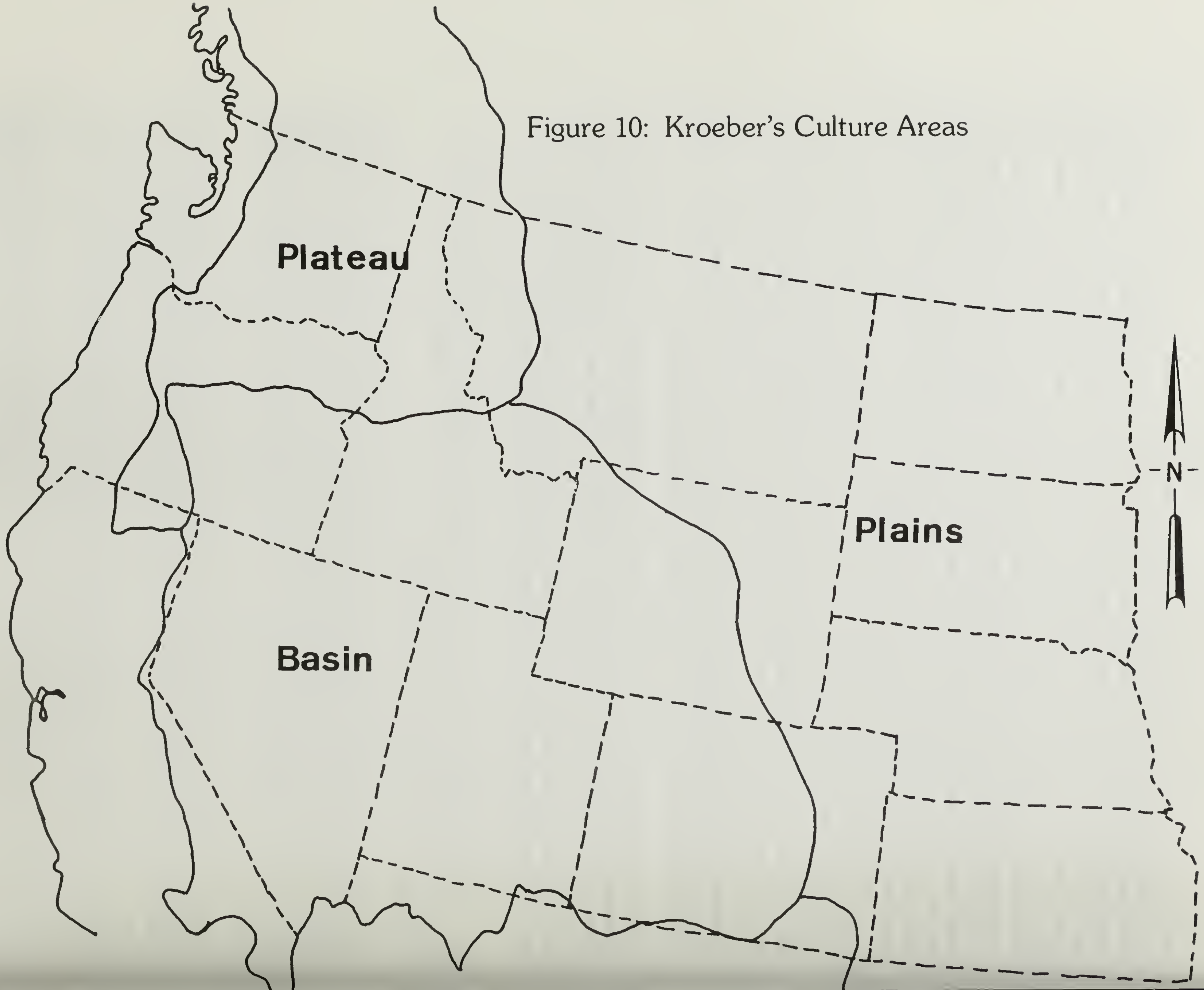


Figure 10: Kroeber's Culture Areas

Lake area (White 1959, n.d.a, n.d.b); and Edmund MacHaffie reported a Folsom site which became known as the MacHaffie site (Malouf 1961).

Factors external to archeology as an intellectual discipline had a significant impact on District archeology much as the WPA and the Depression had influenced the previous period. In this case, the external factor was the creation of the River Basin Survey project and hence the beginnings of salvage archeology (cf. Willey and Sabloff [1974] and Frison [1973] for extensive discussions of this aspect of American archeology). The basic rationale of the River Basin Survey was that, because of the federal government's commitment to developing a series of hydroelectric projects, massive acreages were going to be inundated. Therefore, archeological surveys would have to not only record sites, but the sites had to be evaluated in terms of their relative archeological worth or value. It was a given that not all or even most of these sites would be saved. Therefore, a system for ranking sites was developed. The highest ranking sites were to be "salvaged," i.e., excavated. The impact of the River Basin Survey was relatively minor in the District in terms of how much archeological reconnaissance was generated. Fenenga and Cooper (1951 a,b) surveyed the Sun River and Jefferson River basins, recording five sites and 13 sites, respectively. Hughes and Bliss in 1946-1947 surveyed the area inundated by the Tiber Reservoir (Toole and Liberty Counties) just east of the District. They recorded and described 53 sites. Sites dated from the Middle to Historic periods and site types included bison kills, feature sites (stone ring and cairn), and ubiquitous lithic scatters (Hughes 1948; Bliss 1947). One of these sites, 24TL26, later excavated by Carl F. Miller, was interpreted as a seasonally reused bison ambush camp (1963). Bliss also conducted a very brief survey in the Canyon Ferry region (Malouf 1981).

More important than the brief site descriptions resulting from these surveys is the fact that the notion of relative significance of different archeological manifestations was introduced to the District. This became the underlying principle that structures various cultural resource management strategies in the present period.

Aspects of national trends can be seen in District archeology of this period (1940-1960). The emphasis on early man sites is exemplified by Forbis' excavations at MacHaffie (24JF4). This multicomponent Paleoindian site was interpreted as a lithic workshop and campsite. MacHaffie II was labeled as Scottsbluff on the basis of thin projectile points with parallel collateral flaking (Forbis 1955; Forbis and Sperry 1952).

Settlement patterns were not explicitly projected for the District in this period. However, some tentative speculations about site placement were made. For example, Griswold, in describing sites in the Flathead Lake region, associated site localities with areas adjacent to permanent sources of water (1953). Griswold and Larom used a concept of likely site areas or archeologically sensitive zones, because they based their survey in the Hellgate area on "checking out likely localities." One of the conclusions of their survey was that, when bluff/table lands were available, sites tended to be located on them (Griswold and Larom 1954). Since it was standard practice at the time, they did not indicate what percentage of the localities sampled were bluff/table lands, so it is difficult to evaluate their conclusions.

The influence of cultural ecology on District archeology must be traced more indirectly. In 1955, Antevs published "Geologic-Climatic Dating in the West," which among other things described the Altithermal. The Altithermal was a climatic/temporal period which, according to Antevs, was characterized by hotter, drier conditions on the Plains. Followers of the cultural ecology school working in the Plains Culture Area postulate varying degrees of reaction to these climatic conditions by human populations. These postulated reactions range from total abandonment of the Plains to a decreasing absolute size and wider dispersal of Plains groups (cf. Frison 1978). In any case, followers of this line of reasoning began to perceive the mountainous areas bordering the Plains as places of retreat during the Altithermal. This "mountains-as-refuge" concept has significant implications for interpretive frameworks applicable to District sequences, which became explicit in publications of the next period.

Viewing artifacts/features as products leads to a concern with function, use and manufacturing processes. This concern has already been noted in the work of amateurs in this period. This focus of interest was also found among professionals working in the District in this period. T. F. Kehoe's work, both on tipi rings and on medicine wheels, exemplifies this pattern (1954, 1960). Along with excavation data, Kehoe used the direct historical approach and ethnographic techniques to document the functions of these two relatively common feature types. His work was basically confined to the Blackfoot Reservation. In the case of medicine wheels, he reported that spokes radiating from a central cairn are regarded by the Blackfoot as grave markers for high-status chiefs. His analysis of the function of tipi rings is now a classic. He convincingly stated the case that stone rings are the remains of habitation structures (1960).

The influence of the Culture Area concept is clearly seen in District archeology in the period 1940-1960. Areal comparisons generated by the trait list aspect of Culture Areas are exemplified by Huscher and Huscher (1942). Their article in *American Antiquity* considers "evidence" of Athabascan (proto-Navajo/Apache) migrations via the intermontane regions. The distribution of particular archeological forms (i.e., traits) was used to search for the geographic origins of particular groups (in this case, lithic scatters/temporary camps and the proto-Navajo). Borden's work in the region exemplifies another aspect of the Culture Area approach to archeology in the District. In 1956, he published the results of two surveys in the east Kutenai Region. His conclusions were based on the premise that Culture Areas can be interpolated into the prehistoric periods and that particular traits may be assumed to have ethnic affiliations. He associated the "proto-Kutenai" with expanding stem projectile points. These points may be unnotched, corner-notched, or barbed. This ethnic affiliation was based on a perceived geographic correlation between the territory inhabited by the ethnographic Kutenai and their putative predecessors (Borden 1956).

Perhaps the most significant work of this period in District archeology is Carling Malouf's dissertation, *The Cultural Connections Between the Prehistoric Inhabitants of the Upper Missouri and Columbia River Systems* (1957). Three aspects of Malouf's dissertation are of particular significance: (1) definition of a subarea of the Plateau culture area called the Montana Western Region, (2) the association of changes in lithic material type utilization with temporal periods, and (3) an interpretation of regional settlement patterns through time.

Malouf defined the Montana Western Region (Figure 11) as including parts of western Montana, northern Idaho, and southeastern British Columbia. He defined this unit as a "mountain oriented specialization of the broader Columbia River patterns of hunting, gathering and fishing." He postulated that the changes in elevation provided by the rugged topography of the region made it possible for inhabitants to base their seasonal round on longer periods of collecting "favorite plants" since they could follow the maturation of these plants up the hillsides. He further associated the mountainous topography of this subarea with a higher diversity of plants which could be sought. He described the animal resources of the Montana Western Region as abundant, and noted that the temperature range in the mountains was not as great as in the plains. Modifying winds from the Pacific Coast and more rainfall made the mountains more habitable than the Plains, according to Malouf's formulation. Thus, Malouf applied the notion of Culture Area as a given and "discovered" a subarea which he defined in generalized ecological terms. The vast majority of the Butte District lies within the Montana Western Region.

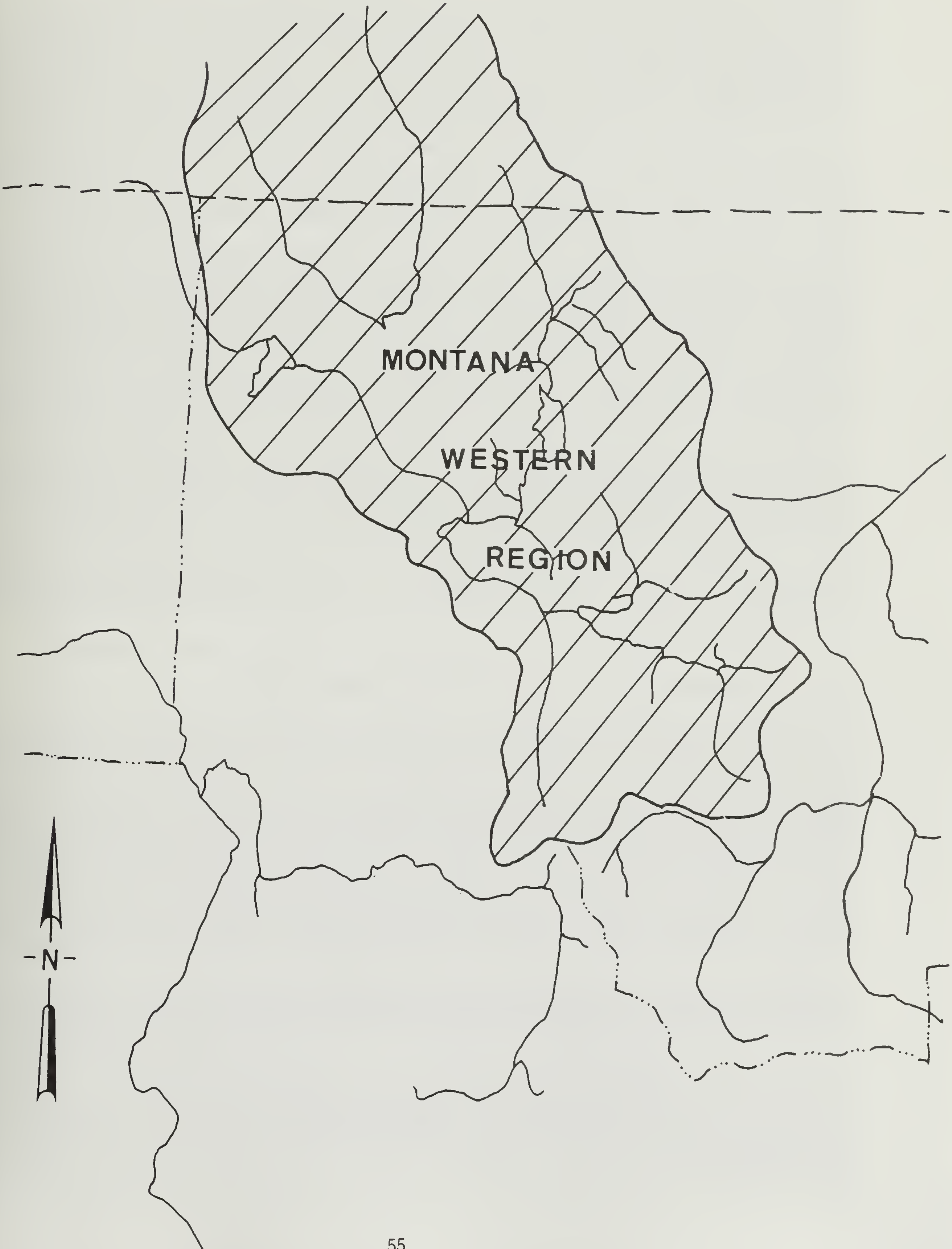
In describing the archeology of the Montana Western Region, Malouf noted changes in lithic material type preference over time. His earliest horizon was dominated by quartzite lithics and characterized by a total absence of ground stone implements. Following this was a horizon marked by corner-notched points made mainly of quartzite and basalt and lacking ground stone. The next horizon was also marked by corner-notched projectile points of quartzite and basalt, with ground stone implements also found. The final horizon was characterized by side-notched points of many lithic types, including a significant percentage of obsidian. The use of obsidian, tubular pipes, and flat-bottomed pottery was associated with the immigration of Shoshonean groups, according to Malouf.

Malouf also noted changes in site distribution over time in the Montana Western Region. In Pre-horse times, inhabitants of the area preferred to camp in the bottomlands or on low terraces above them. More specifically in the valleys formed by the headwaters of the Missouri, occupation sites are located either at the confluence of a side stream and the river or at the mouth of a canyon drained by a reasonably large stream. In the Post-horse period, according to Malouf, the regional population shifted away from centers in valleys and around lakes, which were not along main thoroughfares, to centers near the junctions of well-traveled trails. Pre-horse travel tended to be north-south, with Post-horse east-west (Malouf 1957).

4.6 The Explanatory Period (1960–)

American archeology, beginning in the 1960s, became extremely diverse in its concerns (Meltzer 1979). In most regions of the country, a baseline cultural chronology had been established. The influence of Steward's cultural ecology approach continued to be significant. This was combined with Leslie White's evolutionary scheme whereby cultures were seen to be a developmental product of the environment and the technology used to

Figure 11: Malouf's Montana Western Region



manipulate (i.e., capture energy from) that environment. This fusion of concepts led in turn to a general notion of cultural stages marked by levels of technology, rates, and/or techniques of energy capture, i.e., band, tribe, chiefdom, and state. It was/is thought possible for archeologists to formulate general laws of culture change, i.e., to explain movement through these stages/levels (Willey and Sabloff 1974). New foci of interest came into American archeology in this period via general systems theory, a self-proclaimed need on the part of professionals to become scientists, and finally from the developing ecosystems approach. As used in archeology, systems theory stresses the interrelatedness of cultures and environments. This tied in with the ecosystems approach which saw human populations as just one subset within a larger ecosystem. This is in contrast to the earlier formulations of cultural ecology which viewed cultural systems and environments as separate but interfacing entities. The new emphasis on being scientific led to much acrimonious debate under the rubric of "old" vs. "new" archeology. More significantly for our purposes, it led to an increasing emphasis on deductive reasoning, hypothesis testing, and in general a more explicitly systematic approach to archeological problems (cf. Dunnell 1982; Meltzer 1979).

Also a significant force in archeology beginning in the Explanatory period was the rapid growth of contract work. In the early 1970s, after the establishment of enabling regulations related to the National Historic Preservation Act, the BLM and other land-management agencies hired archeologists and initiated cultural resource management (CRM) programs for federal lands. According to Dunnell, the development of CRM has led to a systemization of archeological research. Specifically, it has led to the use of regional scale research designs and probabilistic sampling schemes. Further, contract work required(s) that the researcher make explicit the rationale for his approach and proceed by the most efficient field techniques currently available. Also, of course, CRM work vastly expanded the scope, the number, and type of projects undertaken in any given area, and thus the data base increased rapidly. Dunnell, although still unwilling to label archeology a science, regards archeology as much more rigorous, explicit, and sophisticated. CRM, he feels, played a large role in this development (Dunnell 1982). The negative aspects of CRM works include the focusing on sites/areas due to potential impacts rather than due to their research potential and the noticeable lack of synthetic statements in most contract-related works (cf. Malouf [1961 and 1981] for a further critique of CRM work).

Diverse interests, methods, and theoretical paradigms also characterize archeological work in the Butte District during the Explanatory period. For clarity, we shall discuss this period in topically arranged subsections rather than in strict chronological order.

4.6.1 Descriptive Accounts in the Explanatory Period

Much of the literature from this period is purely descriptive. In many cases, single sites were described. For example, Shumate described the Carter Ferry buffalo kill, a single-component, Middle period (Pelican Lake) impoundment, which was dated from 3,000 to 2,000 B.P. by obsidian hydration (1967). Other brief site descriptions typical of this period are found in Shumate (1972, 1975, and 1976), Jenni (1962), and Jenni and Jenni (1959, 1960, 1962). In 1982, Shumate summarized years of work in the area in a description of the prehistory of the Missouri River Valley between Cascade and Great Falls. He documented occupation of this area from Clovis through Protohistoric times. All of his data came from surface collections made in blowouts. He proposed three macro-stratigraphic units: (1) grey blow sand of immediate post-glacial age to the Altithermal and containing all Paleo-indian material, (2) Zone 1—brown sand containing Oxbow through Avonlea components, and (3) Zone 2—gray-black soil, mostly in the plow-zone, containing Old Women's and Protohistoric components (Shumate 1982).

Descriptions focusing on particular site types and artifact types are also common in this period. Hogan reported a burial (flexed, single individual) which contained various grave goods, including tubular pipe fragments, seed and bone beads, red ochre, and *Olivella* and *Dentalium* shells as well as evidence of matting (Hogan 1977). Johnson provided a description of Extended Coalescent pottery (1 rim sherd) at 24ME1001, the Horse Butte site (1982). Jasmann published a summary of Folsom and Clovis projectile points found within the District (1963); Shumate considered the form and function of putative atlatl weights from the District (1974); and Darroch (1974) discussed edge-ground cobbles. He proposed that the type exhibiting battering wear was used in stone working, e.g., a tool for striking off blades, and that the polished variety was used either for plant processing or hide preparation (Darroch 1974).

4.6.2 Analytical Studies of Prehistoric Technologies in the Explanatory Period

Rigorous systemization characterized the analysis of lithic technology in this period. Charles Zeier performed a detailed metric and statistical analysis of Besant phase projectile points from the Antonsen site (24GA660). He found that material type was a significant intervening variable in both morphological variation and use-wear patterns (Zeier 1975). Knudson examined in minute detail the Scottsbluff component (MacHaffie II) from 24JF4. She concluded that lithic workers at MacHaffie made large bifacial cores, some thinning flakes, and a few deliberate blades. However, in general they seemed to have focused on cores as implement blanks (Knudson 1973).

Knudson and Zeier are representative of the type of lithic studies current in the District. Almost all emphasis continues to be on finished/patterned tools, with little systematic attempt made to deal with debitage. There are two exceptions to this practice. One is found in the work of various analysts dealing with lithic quarries. Davis' ongoing work at the Schmitt chert quarry (24BW559) and limited testing at the South Everson Creek chert quarry/workshop site (24BE559) recognized the necessity of analyzing the vast amounts of debitage at these sites (Davis 1981). In both cases, Davis was confronted with the problem of finding an efficient way to analyze massive amounts of material. Herbort also encountered this problem in his analysis of 24JF266, the Palmer chert quarry, where he documented the use of fire and water dousing to fracture in situ blocks of material for removal (1981). Given that lithic quarry sites are relatively common in the District and that they do present unique problems in terms of the massive amounts of debris they contain, this methodological concern continues to be significant in District archeology. The second exception is Patricia Flint's work (1980) where she provided descriptions of debitage, including material type, size, and amount of cortex.

One analytical work focusing on ceramic technology systems contributed significantly to understanding District archeology. Simons combined archeological, ethnographic, and replication analysis to produce pottery types found in western Montana. Her experiments illustrated that the techniques described for the production of Kutenai and Blackfoot pottery in the ethnographic record are viable (1979). Her innovative study is unique in its contribution, because it is the only work that concentrates on the process of manufacture and does not assume that style can be equated with ethnic affiliation.

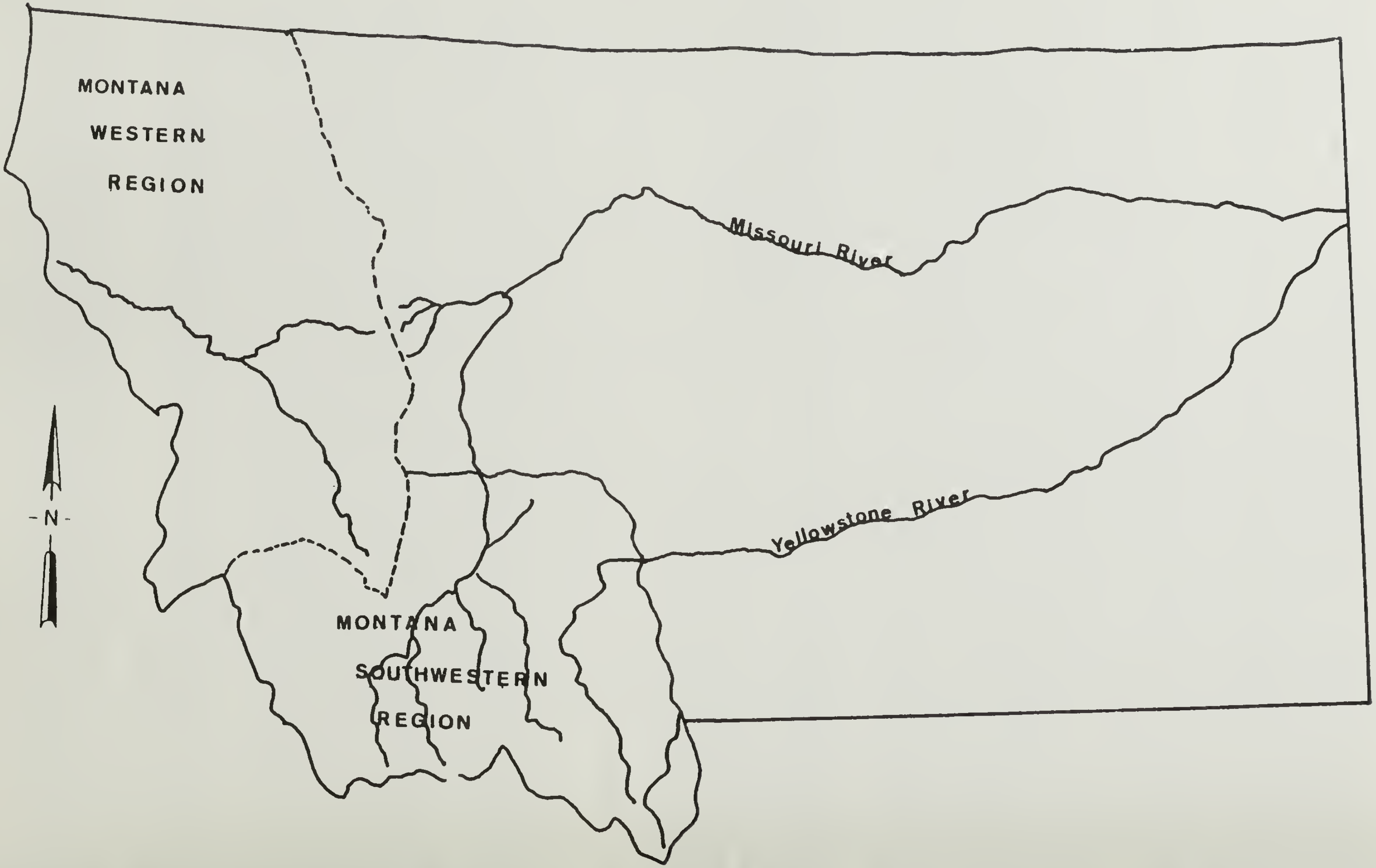
4.6.3 Systematic Survey in the District During the Explanatory Period

Two themes can be found in the survey work carried out in the District during this period. The surveys progressively became dominated by CRM concerns, and concomitantly more explicitly systematic. Further, the influence of cultural ecology and later the ecosystems approach is clearly evident in the sampling designs.

George Arthur described 47 sites in the Upper Yellowstone River drainage (PA301-334; SW201-210; GA305-307). He documented intermittent occupation from the Early period through the Late period in the Upper Yellowstone drainage. In terms of site placement, he concluded that sites "were usually located on level grass covered terraces at the mouths of canyons where water from springs and streams was plentiful and game animals abounded" (1966:28). Arthur did not provide quantitative data to back up this interpretation. He further noted that Middle period sites are always small, that gathering was more important at lower elevations than at higher elevations, and that hunting was the dominant activity at all elevations (Arthur 1966). Again, systematic quantitative support for these interpretations is not presented in the report. It is not clear, for example, how much acreage in different landforms or at different elevations was covered. This is not a criticism of Arthur's work since his methods reflected the state of the art in 1966. His emphasis on the seasonal use of different altitude zones reflects the influence of Emma Lou Davis' (1963) work in the Great Basin and Earl Swanson's work in southwestern Idaho (1966), both discussed here in Section 4.6.6.

In 1966, Lewis Napton reported a survey of the Gallatin River Canyon and valley area. This work is important for several innovations. First, he terminated Malouf's Montana Western Region at the Continental Divide and defined a new subarea, labeled the Montana Southwestern Region (Figure 12) which he saw as being "influenced" by Basin/Desert cultures at two points in time, ca. 5,000 B.C. and A.D. 1,000. Second, he described 45 sites which document intermittent occupation from the Early period through the Late period in the Gallatin drainage. However, in contrast to Arthur, he provided quantitative measures of site density and lithic material use patterns.

Figure 12: Napton's Regions



He estimated site density in the Gallatin Valley at 1/3.1 km^2 and in the Gallatin Canyon at 1/3.1 km^2. He compared this with a density of 5.7/3.1 km^2 around Canyon Ferry and 19.2/3.1 km^2 in the Birch Creek area, but drew no conclusions from this variation. In terms of site placement, his conclusions were similar to those of Arthur. Napton found that 90% of the sites in the Gallatin area were associated with permanent water sources. He described a number of zones, based on altitude, of seasonal use in the mountains:

> Valley (4,000 ft elevation)
>
> site contents: mauls, pestles, milling stones, edge-ground cobbles, effigy pieces, numerous drills and perforators, and side-notched projectile points
>
> Unnamed (4,000-5,000 ft elevation)
>
> site contents: tipi rings, rock alignments, medicine wheels, and pictographs . . . knives and scrapers are numerous; drills, awls and other perforators are infrequently absent . . . "early" projectile point types have been found at sites situated on terraces located in this zone
>
> Canyon (5,000-6,000 ft elevation)
>
> site contents: corner-notched projectile points are the most common type of point, . . . sites are always small . . . knives are the most common implement; scrapers are common; drills and awls are few . . . faunal remains indicate "final butchering" of animals killed near the sites.
>
> Unnamed (6,000-8,000 ft elevation)
>
> site contents: sites are extremely small . . . corner-notched projectile points, knives, and a few scrapers constitute the lithic inventory . . . high altitude pictograph sites are occasionally associated . . . with these hunting camps
>
> Unnamed (8,000-9,000 ft elevation)
>
> finds: isolated points of the Early period . . . occupation sites per se are virtually non-existent (Napton 1966:280-282)

Napton summarized his zonation scheme by observing that archeological material decreases in quantity with increasing elevation. In regard to seasonal use of the zones, he postulated that the large sites located in the central valley of the Gallatin "could be the result of semi-sedentary perennial occupation" (1966:286). The canyon, according to Napton, was used in all seasons except winter by small dispersed task (especially hunting) groups. Finally, Napton's thesis contains some relatively sophisticated observations about lithic material types. According to his data, in the Gallatin area "side-notched points are approximately ten times more numerous than corner-notched points, however, approximately ninety percent of the side-notched points were found on less than eight percent of the known sites" (1966:175). Sixty percent of the side-notched points found in Gallatin valley bison drives were made of obsidian/ignimbrite. He also noted that surface flake samples from Gallatin occupation sites indicate that most lithic materials were not transported more than 32 km from their source (Napton 1966).

CRM-related survey works from this period include Fredlund and Fredlund (1971), Murray et al. (1977), Carlson and Loschieder (1977), Roll (1978), Davis et al. (1980), Collins and Timmons (1981), and Smith (1981). Dale and Lynn Fredlund surveyed 118 km of river frontage at the three forks of the Flathead River where they located and described 26 sites. They summarized their results by characterizing the area as exhibiting high ecological diversity. Further, they postulated that this diversity led to a seasonal round based on shifting campsites to different elevations in different seasons. Thus, their interpretations parallel those of Arthur and Napton (Fredlund and Fredlund 1971). Murray et al. documented the presence of obsidian/ignimbrite quarries in the Centennial Valley of southwestern Montana. Their brief report also recorded cairn, stone ring, and lithic scatter sites and indicated that both Plains and Plateau point types were found in the Centennial Valley (Murray et al. 1977).

Roll (1978) recorded 123 sites in the immediate vicinity of Tiber Reservoir, which is just east of the District boundary. Davis et al. (1980) described a survey of 9,687 ha (23,930 acres) southwest of Townsend in which 87 sites were located (site density = 1/111.3 ha or 1/.42 km^2). Sixteen sites are historic. Thus, the prehistoric site density is one per half section or 1/.5 square mile. The most common site type recorded was lithic scatters, followed by stone rings, cairns, quarries, and game drive sites. Diagnostics recorded on the survey include points from the following temporal units: Early period, Mummy Cave complex, Oxbow complex, Pelican Lake phase, Besant phase, Old Women's phase, and the Protohistoric period (Davis et al. 1980).

In a very brief report, Collins and Timmons indicated that, in the Yaak area, sites found on river terraces tend to be early and lack cryptocrystalline lithics, while those on the floodplain are later and are characterized by a high percentage of cryptocrystalline artifacts (1981).

Marc Smith provided one final example of CRM-related survey in the District during this period. He performed a 10% sample survey of a 22,267 ha (55,000 acre) property in Deer Lodge County purchased by the Montana Department of Fish, Wildlife, and Parks. He reported a total of 46 sites, 4 historic and 42 prehistoric, which yielded a prehistoric site density of 1/54 ha (1/134 acres). Nineteen of the sites yielded diagnostics (Paleoindian, Bitterroot, McKean, Late Middle period, and Late period). Sites tended to be located at lower elevations on level areas, especially on terraces along streams (Smith 1981).

In summary, survey results reported from the District indicate a wide range in District site densities (0.2 to 4.8/m^2). This may be a function of differing site densities in the District, but it may also be a function of different minimal site definitions, survey strategies, and levels of survey intensity. More agreement was found in the realm of site distribution. It apparently holds in all cases that an increase in elevation is correlated with decrease in site density and, in at least two cases, decrease in site size.

4.6.4 Major Excavations During the Explanatory Period

Myers-Hindman, 24PA504 (Lahren 1976). This site is located in the upper Yellowstone River Valley near Livingston. It is a stratified site which spans the period from 7,000 B.C. to A.D. 1,200. The earliest levels contained "Pinto" points, which are notched and, if found in another context, would be labeled as Late Plains Archaic, in addition to more traditional leaf-shaped, early projectile point forms. This site produced an early side-notched/Bitterroot point, radiocarbon dates on McKean cultural materials of 3,500 and 3,100 B.P., and the oldest dated pottery from the Northwestern Plains (Frison 1978:66). Late Plains side-notched points were dated at this site ca. 800 B.P.

Pilgrim, 24BW675 (Davis et al. 1982). The Pilgrim site is a tipi ring site in the Limestone Hills southwest of Townsend. The particular problems intrinsic to the excavation of shallow feature sites were innovatively treated in this excavation. In terms of content, the excavation documented intermittent occupation of a seasonal camp by Pelican Lake, Avonlea, and Old Women's phase peoples who were most likely utilizing the site seasonally as a plant-processing station. The excavations at Pilgrim, however, are most important for their methodological innovations. The stone rings were dug as house units, specifically utilizing circular units, and the area around the site was surveyed for density of plant resources. These data on modern availability of plant resources were analyzed in terms of caloric efficiency of plant procurement systems.

Sun River, 24CA74 (HRA:1983). This site is a stratified occupation site located just west of Great Falls. The particular significance of this site is that it is the first dated occurrence of Oxbow in the District, and in Montana. An interesting change in subsistence strategies was documented within the Oxbow component at this site. Circa 5,200 B.P., 90% of the faunal remains are pronghorn, ca. 4,500 B.P. only 21% are pronghorn and 65% are bison, and ca. 3,500 B.P., 95% are bison and only 3% pronghorn. The authors interpreted this change as a function of drier climatic conditions in the earliest Oxbow levels. Furthermore, they noted that Oxbow peoples, in contrast to Pelican Lake and later peoples, tended to exploit a wide variety of locally available lithic materials as opposed to systematically exploiting more distant quarries. This behavior was correlated with drier conditions during part of Oxbow times: "the need to have restricted movement to areas of secure water may have precluded journeys to upland lithic source areas" (HRA 1983:8-15).

LAURD Project (Roll 1982; Roll and Henry 1982; Roll and Smith 1982). The LAURD project encompassed excavations at several sites as well as survey-generated data in the Kootenai Canyon in the extreme northern part of the District. The project area was in a narrow "V" shaped canyon which Roll characterized as a transmontane setting. The project area was delimited by the lack of traditional resources associated with surrounding areas, i.e., bison, camas, salmon, and caribou. Roll concluded that "the native peoples of the mid-Kootenai emphasized exploitation of deer during periods of seasonal abundance. Populations concentrated in the river bottoms (late winter-early spring) and dispersed at other times to utilize the various resource potential of additional life zones" (Roll 1982:iv). The various excavations, in conjunction with primary geological and palynological records, documented intermittent occupation of the canyon area from ca. 5,500 B.P. to 100 B.P. Despite documented climatic and vegetative changes through time, little change was seen in the subsistence system throughout this time period. Roll explained this as a function of the major resource exploited: "The versatility of the preferred prey species was sufficient to dampen the effects of the . . . climatic-vegetative changes. The diverse topography . . . would provide habitat similar to that available today, but at different elevations or in different exposures" (1982:v). Perhaps more significant than the descriptive archeology of the LAURD project is Roll's systematic organization of District-related data. Two aspects are particularly important: his definition of the Barrier-Falls subarea and his explicit statement that an in situ adaptation may contain projectile point styles known from other geographic areas. Both of these matters are discussed in more detail in Section 4.6.6.

4.6.5 Ecological Models and Settlement Systems Proposed During the Explanatory Period.

The increasing environmental sophistication in District research has already been illustrated by Arthur's, Napton's, Davis', HRA's, and Roll's work in the previous section. Loendorf's work in the Pryor Mountains, although peripheral to the District per se, is an important example of this trend. Loendorf analyzed 183 sites in the Pryor Mountains in terms of the following locational factors: (1) proximity to water, (2) abundance of food, (3) protection from the elements, (4) available fuel supply, and (5) presence of quarryable material. From his results, he formulated a subsistence-settlement model. In essence, according to Loendorf, people moved camps up in elevation in the spring and down in elevation in the autumn. Winter settlements were located in sandstone canyons and reused annually. Spring sites (March through June) are found in several environmental zones, are small, and probably represent single collecting/hunting events. Summer camps in the Pryors associated with the Alpine zone were abandoned in late August for the lower grasslands in order to hunt bison. After the annual bison hunt, people returned to their central base/winter camp in the sandstone canyons (1973).

Also peripheral to the District, but directly relevant to the interpretation of District archeology is Gerald Schroedl's work (1973). Bison are not usually assumed to be an important resource for groups using the western part of the District during prehistoric times. However, in 1973, Schroedl documented the archeological occurrence of bison in the American portion of the Plateau Culture Area. Schroedl found that bison were definitely present in the Plateau in post-Altithermal times and were integrated into existing patterns of resource utilization. Bison became a regular, but not dominant part of the diet (1973).

Two important attempts at reconstructing paleo-environments within the District were also published in this period. R. N. Mack, working in conjunction with the LAURD project, reported pollen core data from Tepee Lake and McKillop Creek Pond in Lincoln County. Mack's analysis documented climatic and vegetational shifts in the region since the last glaciation (Mack 1982). Mehringer et al. (1977) examined pollen cores from the Lost Trail Pass Bog in the Bitterroot Mountains and described climatic and vegetational changes since the last glaciation. In addition, they documented the fire history of the area and the significance of volcanic ashes to the interpretation of the area's paleo-environment. The HRA report on the Sun River site also contains extensive appendices with supporting paleo-environmental data.

Recently, two new conceptualizations of settlement-subsistence patterns were articulated. Although not yet directly applied to District sites, these new approaches may well provide avenues for future research in this area. Wright, Bender, and Reeve (1980) appear to have taken Steward's injunction to archeologists to compare parallel situations in order to find causes of culture change to heart. In "High Country Adaptations," they compared the adaptations of Shoshonean peoples of northwestern Wyoming with pre-agricultural hunters and gatherers of southwestern Asia. In both areas, mountain-dwelling sheep were hunted in similar environments. They asked the question "Why did domestication occur in one area and not the other?" Basically, their answer to this question centers on resource availability/predictability. In the Wyoming case, the bighorn sheep and man's range overlap year round. While it is true that sheep were more often hunted in the late summer-early fall, it was logistically possible to take them year round. In the southwestern Asian case, the mouton and man's ranges did not overlap during the winter. Domestication of this species caused a change in its winter range so that it became a predictable year round available species (Wright, Bender, and Reeve 1980). Since the bighorn was always available in the Rockies, apparently there was no adaptive advantage to modifying the habits of the sheep. In order for domestication to have taken place in this area, changes in human settlement would have been required, i.e., people would have had to schedule settlements in terms of following the herds of bighorn which, in turn, would have led to a more extensive utilization of Alpine zones (Wright, Bender, and Reeve 1980).

Ames and Marshall, working in the southern Columbia Plateau, recently suggested that it was the intensification of plant exploitation, not the exploitation of salmon, that led to the establishment of semi-sedentary villages by 4,300 B.P. in the southern Columbia Plateau (1980). They argued that the more reliable a resource and the more restricted its availability in time and space, the more critical it becomes as a determinant in settlement systems. Further, they indicated that, while salmon may have been relatively reliable and limited in time and space, their low population density in the Plateau did not allow the intensified exploitation of this resource (Ames and Marshall 1980). Therefore, camas became a determinant of village locations (cf. Aaberg [1981] for a parallel example in the District of plant availability acting as a site determinant).

Both of these works emphasize the availability and predictability of resources as explanatory factors in culture change. These concepts, combined with the mosaic, diverse nature of resources in the District and Roll's documentation that in the transmontane area this diversity serves as a leveling factor on climatic/vegetational changes over time, might readily be combined to formulate an ecological model of District resource utilization patterns. At the most general level, it might be postulated that, in the transmontane portion of the District, high resource diversity combined with low resource density generated a situation in which food resources were always available, but no particular resource was predictable. Therefore, human population density would be low. The strategy of adaptation would entail maximization in terms of flexibility, both at the dietary and social level. Groups inhabiting the area would be broad-spectrum foragers who would try to increase the productivity of their environment through species/habitat management (cf. Part III) and increase the efficiency of their harvesting technologies. At the level of social organization, flexibility would be expressed as seasonal variation in population aggregation, and individual/family affiliation with any particular group would be variable. Flexibility breeds stability. This pattern would hold throughout prehistoric time until the introduction of the horse, which allowed for specialization on one subset of recognized food resources and population aggregation.

4.6.6 Contrasting Paradigms in the Explanatory Period

Essentially, two paradigms have competed to interpret District prehistory. The first is the "Outside Influences" paradigm. This framework seeks to explain the various archeological manifestations within the District as a product of Basin/Plains/Plateau influences. It derives from the Culture Area approach and is most recently manifested in the "mountains-as-refuge" hypothesis. The major proponent of this particular paradigm is Frison (1978). Less systematic, but pervasive in the literature, is the assumption of this paradigm by those who ascribe to projectile point styles, the presence or absence of ground stone tools, and pottery types as ethnic and hence areal affiliations.

The second paradigm widely used to interpret archeological manifestations in the District is labeled the "In Situ Development" paradigm. In this case, emphasis is placed on understanding the relationship between the population inhabiting an area and its place in the local ecosystem. The influence of the ecological approach is clearly seen in this paradigm. Ultimately, this approach derives from Malouf (1957) and Swanson's (1972) work at Birch Creek. Workers within this paradigm have made two significant contributions toward the development of District archeology: the seasonal "transhumance" settlement/subsistence model and the definition of subareas based on ecological variables.

Frison's view of montane areas, like that of most other Plains archeologists, includes the notion that, during the drier conditions of the Altithermal, plainsmen retreated to the cooler, wetter mountains to take advantage of plant and animal resources in those areas. This change in adaptive strategy is signaled in his chronology by the use of the term "Archaic." An Archaic adaptation is one of foraging, i.e., the use of a broad-spectrum of plant and animal resources. It results, in terms of site formation, in the increased frequency of plant-processing tools, e.g., manos and metates (1978). Frison postulated the following chronology, which has since been applied by some workers within the District:

Paleoindian 10,000 B.C. — 6,000 B.C.
Early Plains Archaic 6,000 B.C — 3,000 B.C.
Middle Plains Archaic 3,000 B.C. — 1,500 B.C.
Late Plains Archaic 1,500 B.C. — 1 A.D.
Late Prehistoric A.D. 1 — A.D. 1,800.

By using the term "Archaic," Frison intentionally emphasized a foraging adaptation, as contrasted with a specialized hunting adaptation. He has, in fact, suggested that foraging may be the proper label for Paleoindian mountain dwellers,

> Only a few scraps of sound evidence that tell us much of past human plant usage have been recovered . . . seeds representing a number of species have been recovered from what may be storage pits in the Paleoindian period . . . but in the context of a foothill-mountain oriented group that was apparently more of an Archaic group than a hunting one . . . (1978:369).

Like the followers of the "In Situ" paradigm, Frison's interpretive framework was heavily influenced by concepts from cultural ecology. The major difference is that he is interested in making regional statements and examining relationships between different areas. Thus, he utilized perceived parallels in artifact assemblages in order to postulate interregional influences/contacts.

Frison's emphasis on foraging provides a bridge to the second paradigm of "In Situ Development."

Earl Swanson's early work in Birch Creek established the groundwork for development of the "In Situ" paradigm (1966). Swanson argued simply that the Rocky Mountain area is not marginal to the Plains and Plateau, but is rather a core area that has been continuously occupied throughout prehistory. It has been continuously occupied, according to Swanson, because food resources were always available in the mountains while, at lower altitudes, plant and animal distributions were sharply discontinuous during prehistory because of climatic variations (1966).

Equally important in the early development of this paradigm was a seminal article published in 1963 by Emma Lou Davis: "The Desert Culture of the Western Great Basin: A Lifeway of Seasonal Transhumance." Several points in this article are significant here. First, she carefully demonstrated the effect of seasonality both on the use of different altitude zones and items discarded in a site, e.g., summer sites are low elevation meadows containing numerous manos-metates. Second, her illustrations indicate that "Plains" projectile points are found in the Basin. Third, unfortunately, is her use of the term "transhumance" to label a seasonal round of hunters and gatherers. Transhumance, as used in all basic anthropology sources, refers to a strategy of adaptation whereby a human population that is dependent upon *domesticated animals* herds these animals following a seasonal round based on altitudinal changes, e.g., high alpine pastures in the summer to lowland pastures in the winter. The use of the term "transhumance" to describe hunters and gatherers is unfortunate since it is misleading to those unfamiliar with regional usage. However, because this use of the term is entrenched in Montana archeology, we retain it here. It is interesting to note, however, that in at least one area "transhumance" hunters and gatherers evolved into transhumant pastoralists (Wright, Binder, and Reeve 1980). In southwestern Asia, both pre-agricultural hunters and gatherers and later pastoralists followed the same seasonal round keyed to altitudinal change. The seasonal "transhumance" model should, therefore, be understood in the District context to refer to hunters and gatherers who scheduled use of their environment such that they tended to use different altitudinal zones during different seasons. Proponents of this particular model are Arthur (1968), Napton (1966), and Loendorf (1973). In this paradigm, manos and metates become indicators of seasonality rather than evidence of Basin influence.

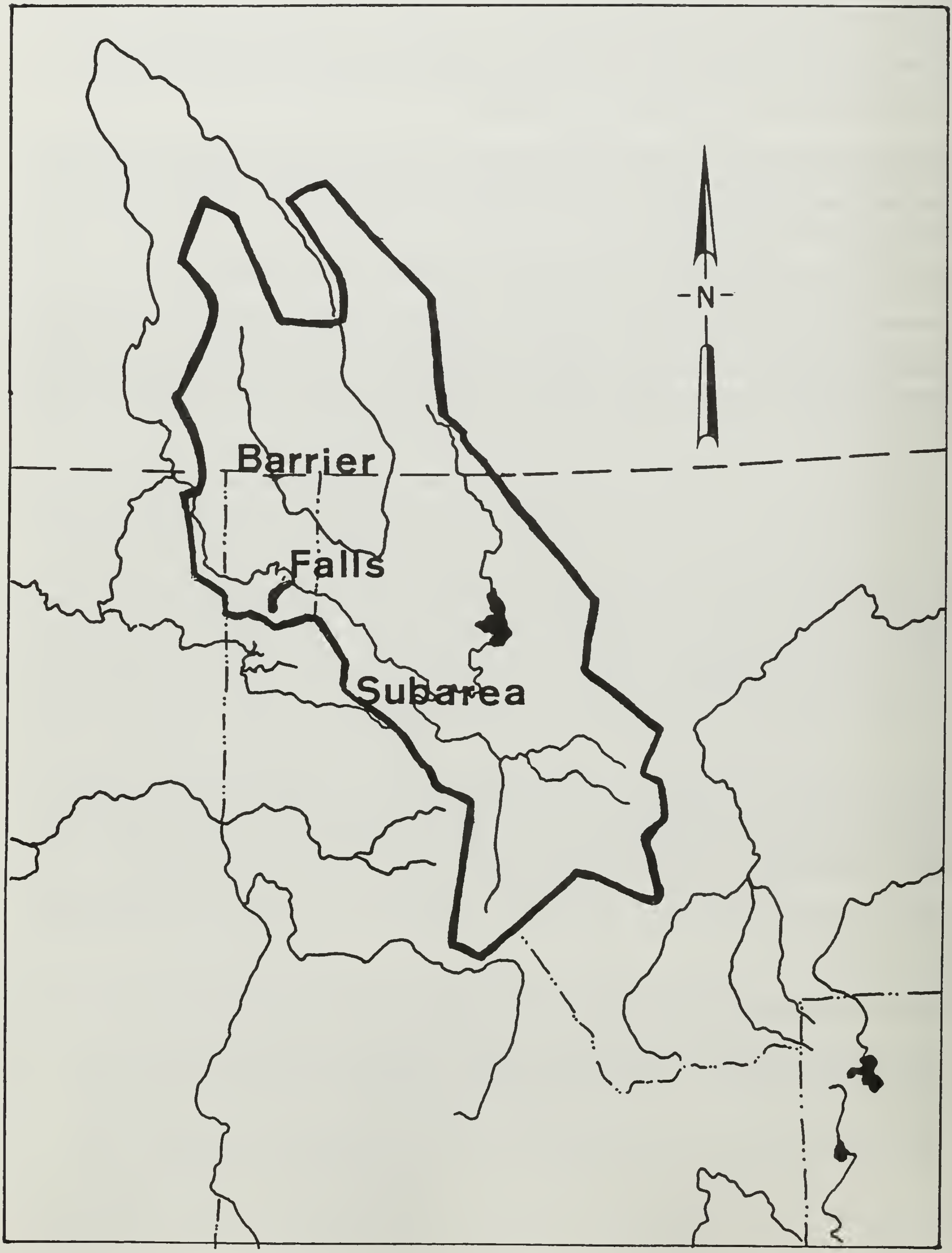
An alternate expression of the "In Situ" development paradigm appears in Roll (1982) and Flint (1982). Both postulated regional subareas/areas on the basis of ecological conditions and then examined cultural development within that context.

Roll defined the Barrier Falls Subarea of the Interior Plateau Archaeological Area as that subarea that consists:

> of the entire drainages of the Kootenai River upstream from Bonnington Falls and the Pend Oreille River above Metaline Falls . . . The Barrier Falls subarea . . . closely approximates in size and content Malouf's (1956) Montana Western region. A principal difference is the exclusion of the Columbia River proper from the subarea . . . the terrain we define as the Barrier Falls subarea is included by Wissler (1917) in his discussion of food areas as part of the salmon area. It is the total absence of this critical resource that led to the definition of the Barrier Falls subarea (Roll 1982:1.13-1.14) (Figure 13).

Roll's cultural historical outline of Kootenai Region prehistory, which he referred to as provisional, was based on the typological cross dating of projectile points which have stylistic analogues in the Plains and Plateau, in

Figure 13: Roll's Barrier Falls Subarea



combination with local geomorphological, palynological, and radiocarbon controls. He postulated six phases: Yarnell, Warex, Stonehill, Kavalla, Calx, and Bristow. Importantly, Roll indicated that a classic "Plains" projectile point type, e.g., Avonlea, can and does exist in the context of a locally adapted subsistence strategy.

The Bristow phase dates from 3,500 B.C. to 2,500 B.C. and contains projectile points that fall within the range of variation for the Oxbow phase and crude, straight-based, near lanceolate-shaped projectile points. The next phase, Calx (2,500-1,300 B.C.), contains points analogous to Plains Duncan and Hanna point types. The Kavalla phase (1,000 B.C. — A.D. 200) was characterized by the appearance of a triangular, expanding base, corner-notched projectile point: "Similar specimens are attributed to the Pelican Lake Phase (ca. 1,000 B.C. — A.D. 200) in the Plains sequence (Reeves 1969) and the early portion (ca. 800 B.C. — ?) of the Harder phase in Lower Snake River typology (Leonhardy and Rice 1970)" (Roll 1982:5.13). Further, Roll noted that notched pebbles made their first appearance in the Kavalla phase.

The Stonehill phase (A.D. 200-700) was characterized by a disparate set of projectile points that may be considered only a distant stylistic analogue to the Besant type. This period is bracketed by C-14 dates, but Roll was not satisfied with the classification of points in this phase.

The basic innovation underlying Roll's provisional chronology is that the phases are seen to represent a local adaptation. The populations who are part of this local hunting and gathering adaptation, which emphasized deer procurement, winter aggregations on the valley floors, and dispersal to higher areas in the other seasons, made and used points that exhibit morphological similarities to points from other areas. Roll's focus was not on these stylistic similarities, as it would be in the "Outside Influences Paradigm," but on the adaptation per se.

> Conceptually, the expression of a local sequence tends to focus our attention inward. We begin to attempt explanations that focus on internal rather than external forces as elements in local development. *Explanations dependent on diffusion of traits or migration of people are simply expedients that ignore the enormous creative potential of indigenous people adapting to and modifying their immediate environment.* Knowledge of where a trait came from is usually of less value than knowing how it was used and where it fit in the local cultural adaptation. Although we have been obliged to import our chronological control the subsistence strategies are local (Roll 1982:5.8-5.9, *emphasis added*).

Thus, it is clear that the two competing paradigms in use during this period asked different questions of the same data. Participants in each paradigm perceived that the questions they chose to ask were at least the most interesting, if not necessarily the most valid.

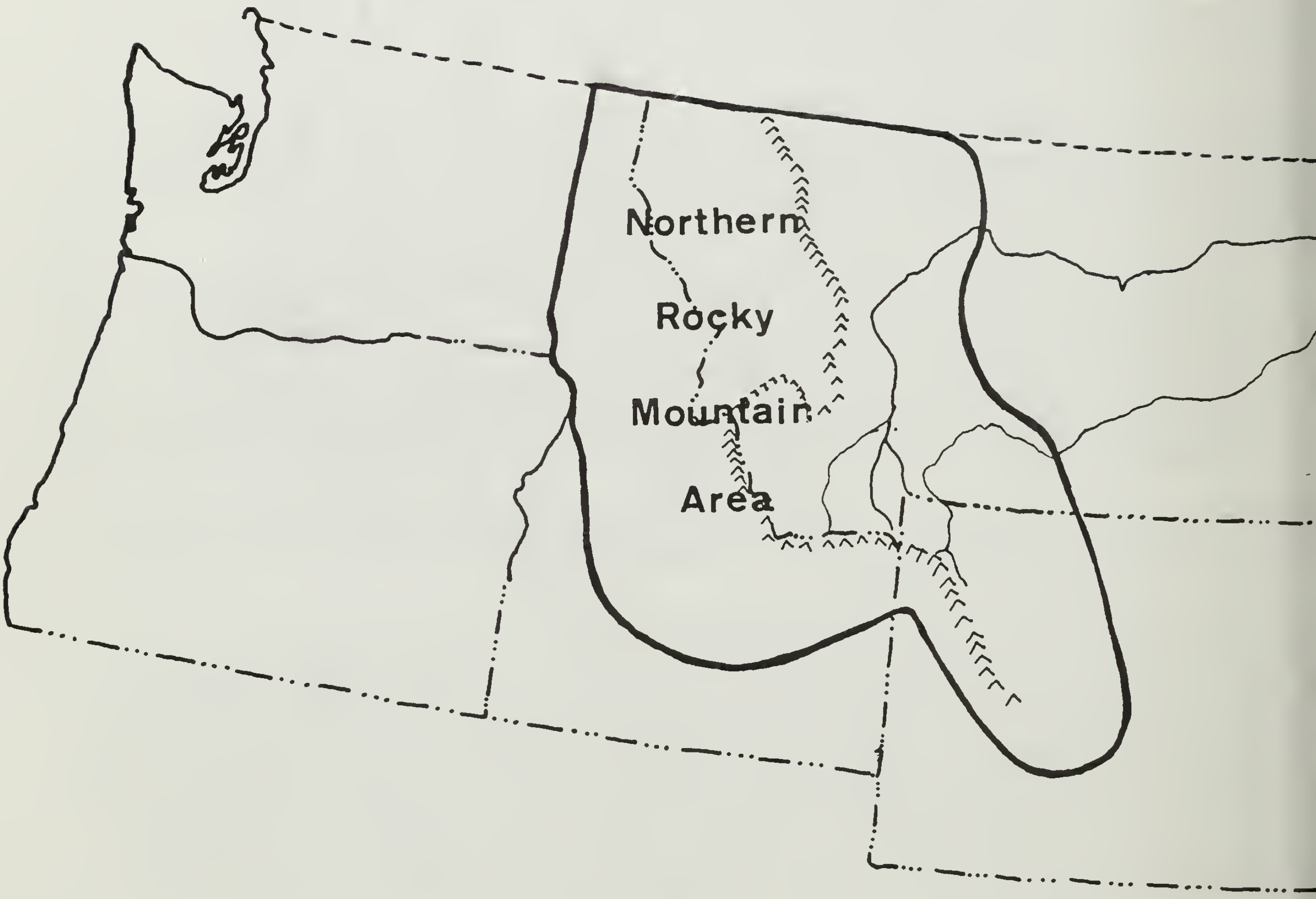
One final representative of the "In Situ" paradigm is Patricia Flint's view of the Northern Rocky Mountains. Her dissertation presented environmental and archeological data in support of the thesis that the mountains of northern Idaho and western Montana are a unique cultural region, not a part of the Northwestern Plains, Interior Plateau, or Great Basin Culture Areas. In support of this view, she described results of excavations at the Graybeal site in the Flint Creek Range and a survey of the surrounding area. The site, which she interpreted as a winter occupation, documented intermittent occupation of the area by peoples of the Hanna, Pelican Lake, Besant, and Old Women's phases. Although Plains projectile point terminology was used, similarities were also noted with Plateau and Basin point types. Flint, like Roll in the Kootenai region, attributed the archeological manifestations in the Flint Creek area to indigenous, locally adapted populations and inferred no diffusion/influences from outside areas on the basis of projectile points.

Several important differences exist between Roll's and Flint's views, however. First, Roll considered the Barrier Falls Subarea a part of the Interior Plateau Archaeological Area. Flint's Northern Rocky Mountain Area is given taxonomic equivalence with the Interior Plateau. Flint's Northern Rocky Mountain Area is much larger than the Barrier Falls Subarea (Figure 14). Roll defined his subarea in terms of the lack of anadromous fishes; Flint defined her area in terms of topography which set limits on climatic conditions and hence vegetational communities.

Flint, like Roll, developed a chronology, which is briefly summarized below:

> Northern Rocky Mountain Prehistoric Period I (12,500-8,000 B.C.) Clovis hunters utilizing the region by 9,500 B.C. Folsom also occurs.

Figure 14: Flint's NRMA



Northern Rocky Mountain Prehistoric Period II (8,000-5,000 B.C.) Characterized by spear points, Alberta-Scottsbluff, Haskett, Birch Creek, Lovell Constricted, and Pryor Stemmed. The climate during this period was cooler than the present.

Northern Rocky Mountain Prehistoric Period III (5,000-2,000 B.C.) Begins with the introduction of large side-notched dart points . . . Climate was warmer, but not necessarily drier . . . particularly favorable for human habitation. The Bitterroot Side Notched . . . stemmed indented base, eared indented base (Oxbow variants and Elko Eared variants), expanding stem notched base, and Lanceolate Indented Base (a McKean variant) are characteristic of the period.

Northern Rocky Mountain Prehistoric Period IV (2,000 B.C. — A.D. 0) Characterized by Hanna Stemmed, Northern Rocky Mountain Fishtail, Corner Notched Concave Base (Pelican Lake Variants), and Northern Rocky Mountain Convex Base Corner Notched.

Northern Rocky Mountain Prehistoric Period V (A.D. 0 — ?) Characterized by small notched arrow points. There is one shallowly side-notched point which appears to be a dart point (a variation of Besant). In order of dated appearance, the distinct projectile point types are Blue Dome Side Notched, Samantha Side Notched, Mummy Cave Corner Notched, and Fine Triangular (Flint 1982:260-261).

4.7 Summary of Historical Trends in District Archeology

From 1492 to 1840, the Speculative period, various fur trappers, explorers, and missionaries recorded in their journals various incidents, events, and items of material culture they encountered among Natives. These journals were later used by professional archeologists as sources of ethnographic analogy. As noted in Part III, ethnographic analogy can be used either as a source of supportive documentation for various interpretations or as a basis for generating relatively non-ethnocentric hypotheses for testing. The former approach pervades works on District archeology. This report is the only work on District archeology that explicitly takes the latter approach, with the partial exception of Roll (1982).

In the period from 1840 to 1914, the Classificatory-Descriptive period, several major scientific expeditions collected vast amounts of ethnographic data relevant to the District. These earliest formal ethnographic efforts are often more useful to archeologists than later efforts because of the Boasian emphasis on recording details of material culture. The first formal archeological reports on District sites occurred in this period as purely descriptive accounts by nonprofessionals.

Between 1914 and 1940, the first half of Willey and Sabloff's Classificatory-Historical period, several social factors influenced the development of District archeology. The Depression and its social concomitant, the WPA, supported work at Pictograph Cave which eventually served as the groundwork for the first regional chronology. The first systematic professional archeology occurred in this period, i.e., Mulloy (1958). However, avocational archeologists continued to contribute descriptive accounts of sites and/or artifacts of archeological interest in the District. The Culture Area concept and cultural ecology became pervasive in American archeology in general and were systematically applied to the Butte District during the second half of the Classificatory-Historical period.

After the use of C-14 dates became widespread, archeologists turned their attention to questions of context and function. These concerns dominated District archeology in the period from 1940 to 1960, and they continue to be important today.

Formation of the River Basin Survey Project in this period generated a limited amount of survey within the District, but, more importantly, it laid the intellectual groundwork for the development of cultural resource management programs in the District by developing and applying the notion of relative significance.

Forbis documented the Early period in the District in his excavations at MacHaffie (1955). Some tentative speculations about site distribution were made during this period. Frequently, speculation centered on the availability of water and preferred landforms as site placement determinants. The question of the function of particular items of material culture was addressed by professionals such as Hoffman (1955) and Kehoe (1960). The most significant archeological work of this era was Malouf's delimiting of the Montana Western Region. This was the first systematic attempy to define the distinctive features of the transmontane area of western Montana.

Explanatory period (1960—) District archeology is characterized by diverse interests, the development of CRM programs and consequently more systematic survey techniques, and an exploration of a wide variety of special problems, i.e., specialized lithic analysis, lithic quarry exploration, development of new methodological approaches to stone rings, and so on. The two competing paradigms of the period, "Outside Influences" vs. "In Situ Development," reflect different interests of researchers in the District, as well as their different intellectual backgrounds. The amateur/avocational archeologists of this period continued with their descriptive efforts, but now also took the first steps toward analysis. For example, Darroch (1974) and Shumate (1974) explored questions of context and function of edge-ground cobbles and atlatl weights, respectively.

We see the future history of District archeology as a continuation of work within both the "Outside Influences" and the "In Situ" paradigms. As long as there is an emphasis on stylistic variation in projectile points, the former will remain important. We suggest, however, that work using the "In Situ" framework will prove to be most useful for land management purposes, simply because it focuses on research questions which tend to be more locality specific. It is those workers who use this paradigm who will eventually produce locally applicable models of site distribution.

PART V. NATURE AND DISTRIBUTION OF SITES ON BLM LAND IN THE BUTTE DISTRICT

5.1 Available Data

5.1.1 Sites on BLM Lands

This chapter summarizes available data about the types, attributes, and distribution of sites recorded on land administered by the BLM Butte District. These data were derived from searches of several repositories. Site forms are available at the University of Montana, and copies of most of these for sites on BLM lands in the Butte District are on file at the Butte Office. The Butte Office also has updated information on a number of sites and data for a few sites not yet reported to the University of Montana files. Additionally, Montana State University has a few site files and updated site data that are not available from the other repositories. All repositories were searched and data were collected on all prehistoric sites definitely or likely located partially or totally on BLM-administrated lands in the Butte District. The resulting data set derives from 793 prehistoric sites and they are listed in Appendices I and II.

Originally, the objective of these repository searches was to collect data about the type, attributes, age, and environmental setting for each recording site. In many cases, all of these data types were not available for all sites. Ultimately, the following data types were recorded for all or most sites:

site number
site type
major landform
site area
elevation
cultural materials observed (lithics, bone, FCR, and charcoal)
cultural features observed (stone rings, cairns, alignments, pits, vision quest structures, hearths, and other)
number and type of diagnostics observed

Site types employed are basically descriptive, based on the dominant cultural manifestation observed (alignment, cairn, hearth, lithic scatter, rock art, pits of blinds, stone ring, rockshelter, trail, or wickiup). Three additional site types, bison kill, ceremonial, and quarry, bear functional names which are largely descriptive. The bison kill type was used when a distinct bison bone bed was reported. Ceremonial sites are those dominated by vision quest structures or inexplicable feature types. Quarry sites are those with exposures of a workable lithic material and a rich lithic scatter of this particular lithic type (often with many large primary flakes). The "unknown" site type was used when insufficient data were reported to determine dominant site attributes. In many cases, site type designations based on minimal data may be modified as a result of future investigations.

Six major landform types were used: breaks, highlands, lowlands, upland or mountain creek, ordinary uplands, and unknown. These are very broad landform categories and they fall far short of our original hope of recording numerous specific environmental variables for each site. However, we found even this general level of environmental data lacking on all but the more recent site forms. We obtained landform data by reviewing topographic maps for site locations, in most cases. The "breaks" landform type was used for the narrow strip of deeply dissected terrain that borders large floodplains. The "highlands" type was used for all higher elevations away from rivers or creeks and includes most of the rugged mountainous terrain. The "lowlands" type was used for the floodplains of major permanent streams. The "upland or mountain creek" landform type was used for those sites within 200 m of a small creek or tributary, some of which are seasonally dry. The "ordinary uplands" landform describes areas of level or gently rolling terrain above floodplains and breaks, but below foothills. The uplands normally support grasslands and are most common in the southern and eastern portions of the District. The "unknown" landform was used when a site could not be located on a topographic map.

Site area is generally that listed on the site form converted to square meters. In some cases where no dimensions or area were listed, we measured the site area as marked on the topographic map. Specific site areas should be viewed with extreme caution. Some researchers were prone to report very liberal site areas, such as "5 acres," for a single tipi ring with no surface cultural material. Others described only the dimensions of a small cutbank where a large buried site was discovered.

The remaining data were taken directly from site forms. Elevation was reported on most forms or appeared on the accompanying topographic map. Data regarding cultural materials, features, and diagnostics were taken directly from site forms. We attempted to standardize some terms and, thus, combined stone ring with arcs, and also combined "pits" with "hunting blind depressions." A staggering variety of point type names have been used, reflecting the variable backgrounds and experience of surveyors as well as the refinement of artifact types over the last 30 years. We tried to standardize point and phase terminology and chose to use the named types of the Northwestern Plains simply because most points had been typed using this system. The result is intended to represent a chronological sequence, not necessarily a Plains affiliation for all points. Since these points were typed by the various individuals who reported the sites and not by a single person, point typing reflects many different biases and experience bases.

5.1.2 Extent of Survey

One objective of the file searches was to document total site and site type densities in counties and larger portions of the Butte District. Unfortunately, most sites were recorded in the days before researchers began keeping records of the amount and location of actual areas surveyed. In the last few years, the Butte District Archeologist has reviewed previous reports and marked topographic maps with the actual location and size of surveyed areas on BLM lands. We reviewed the topographic maps and recorded the number of acres surveyed (at Class II and Class III intensity levels) for each county and also noted the number of prehistoric sites recorded on surveyed lands. These data form the second data set and they permit preliminary comparisons of site densities in portions of the District.

The topographic maps indicate a total of 32,600 ha (80,512 acres) of BLM land surveyed at Class III intensity and an additional 5,060 ha (12,503 acres) sample surveyed at Class II intensity. A total of 340 prehistoric sites were recorded for these surveyed areas; this is less than half of the 793 prehistoric sites from BLM lands noted in Data Set 1. However, the smaller site total had to be used to calculate site densities because the full extent of past surveys was not recorded. A discussion of site densities for portions of the area appears in Section 5.2.

5.1.3 Diagnostics Reviewed

The reviewed site forms that form the first data set contain many accounts of diagnostic artifacts found at sites and typed by surveyors (Appendix II). In order to correct for the different biases and backgrounds of researchers who typed these points, we reviewed and retyped all available diagnostics from sites on BLM lands. To do this, all diagnostics from BLM sites in possession of the Butte District Office and curated at the University of Montana and Montana State University were examined and point type and material type noted. This included points recovered from the surface and by subsurface excavations. All points were reviewed by the same two people to make the type designations consistent, but they are not necessarily ultimately correct.

A total of 538 diagnostics (534 points, 4 ceramics) were reviewed, and these data form a third data set. Many of the points (N=217) could not be assigned to a particular phase or complex. As for the site forms, the traditional Northwestern Plains typology (Reeves 1969) was used for consistency because most original designations employed this system. Again, this does not imply a Plains rather than Plateau or Basin affiliation but rather is intended as a general chronological sequence. Results of comparisons of these data appear in Section 5.4.

5.1.4 Radiocarbon Dates

In 1982, radiocarbon dates from Montana sites were compiled and published (Davis 1982). Most of these dates were not from sites on BLM land. Additionally, there is no way to assess how representative this compilation is of the true extent and distribution of prehistoric occupations in Montana. However, it does contain 322 dates for the State and, as such, constitutes a relatively large sample of relatively accurate age determinations. The data in the compilation were reviewed and dates from the Butte District were arranged by age. Questionable dates (as interpreted by Principal Investigators) and dates from paleontological sites were excluded. This produced a list of 86 accepted dates from archeological sites in the Butte District, which formed a fourth data set used for comparison with data from diagnostics reported (Data Set 1) and diagnostics reviewed (Data Set 3). Results of this comparison appear in Section 5.4.

5.2 Areal Site Distribution

5.2.1 Site Types and Attributes

Site types and attribute distributions within the District may be useful for investigating research questions about the types of prehistoric adaptations in portions of the District. The sample of 793 sites in Data Set 1 is really not large enough to test detailed hypotheses involving particular site types in each county. Additionally, the sample was drawn only from BLM lands and these may not be representative of the entire District. However, it is possible to form a few preliminary hypotheses, based on Data Set 1, that will be subject to future tests with more complete data.

An initial set of hypotheses involves the distribution of typical Northwestern Plains site and attribute types within the District. The environmental review in Part II suggested that the open prairie adaptation would have been most viable on the eastern edge and perhaps portions of the southern part of the District. Following this logic, typical Plains site types (bison kills, stone rings, and alignments) should be most common in the eastern or southern parts of the District. On the other hand, site types less commonly associated with a prairie adaptation (pits or blinds and wickiups) should be more common west of the Continental Divide and perhaps also in some sections of the southern portion of the District.

Table 5 shows the distribution of site types by county. Data in this table do not contradict the hypothesis of different distributional patterns for typical and atypical Plains sites. However, overall site distribution is so strongly concentrated in Beaverhead and Madison Counties (516 of 793 total sites) that it is difficult to document strong patterns in the remaining areas. All of the bison kills, 13 of the 16 alignment sites, and 69 of the 90 stone ring sites occur on the extreme eastern and southern edges of the District. Only four typical Plains type sites (3 stone ring sites and one alignment site) occur in counties spanning or west of the Continental Divide. This suggests support for the hypothesis, but, unfortunately, the atypical Plains sites (pits or blinds and wickiups) also occur in the extreme southern portion of the District (5 of 7 pit or blind sites and all 5 wickiup sites are in Beaverhead and Madison Counties).

The Resource Areas of the original Butte District roughly conform to the distribution of resources noted in Part II. The Garnet Resource Area is west of the Continental Divide and is more typical of Pacific climate-influenced regions (Figure 15). The Dillon Resource Area is east of the Continental Divide, with broad grassland valleys and high mountain ranges. The Great Falls Resource Area is now part of the Lewistown District which is largely a prairie-dominated area. The Headwaters Resource Area contains a bit of everything and is not a consistent ecological or archeological unit.

Table 6 shows the distribution of site types and feature types in each resource area. The Garnet Resource Area is strongly dominated by lithic scatters, along with a number of quarry sites. Feature sites are not common and are generally quite small. The Great Falls Resource Area has few recorded sites on BLM land, none of which contain many features. Typical Plains type sites (bison kills and stone ring sites) are well represented (33%). The Dillon Resource Area contains all site and feature types recorded and, indeed, contains 60-65% of all sites and features recorded on BLM land in the District. About 13% of the sites in the Dillon Resource Area are of typical Plains types (alignments, bison kill, and stone rings) and about 7% are quarry sites. The Headwaters Resource Area contains a variety of site types, but has a distinctive Plains flavor, with 22% of the sites representing typical Plains types.

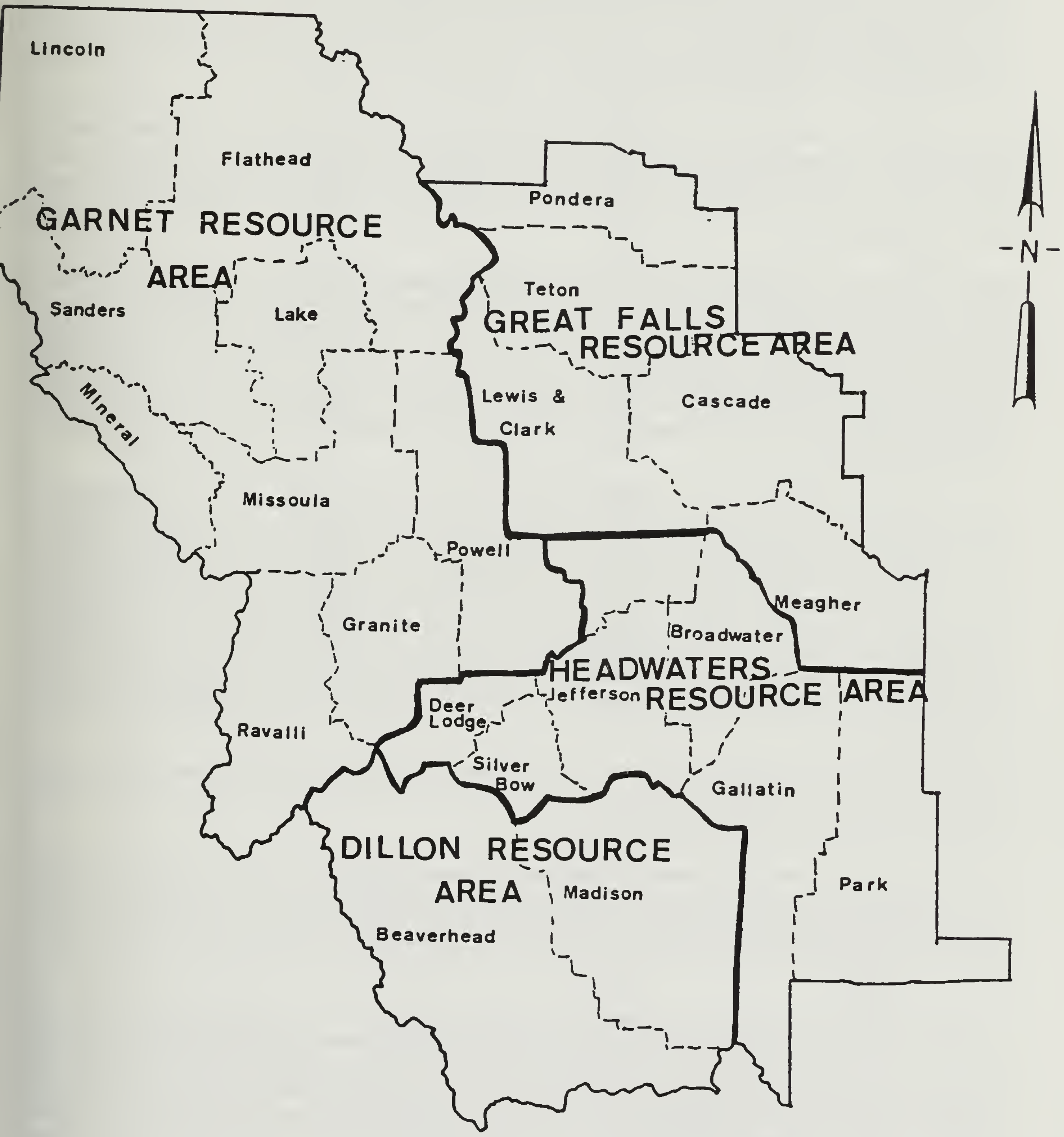
Table 5. Site Types by Counties

County	Number of Sites by Type														
	Alignment	Bison Kill	Cairn	Ceremonial	Hearth	Lithic Scatter	Rock Art	Pit or Blind	Quarry	Stone Ring	Rockshelter	Trail	Unknown	Wickiup	Total
Beaverhead	6	2	26	6	1	270		4	25	24	1	3	11	2	318
Broadwater	2		8			57			6	16	2		3		94
Cascade		1		1		1							1		4
Deer Lodge						2				1					3
Gallatin						3				3					6
Granite						21			6	1			1		29
Jefferson			2			37	1		2	3			1		46
Lewis & Clark	2		2			11				15					30
Madison	5	5	8	4	1	71	2	1	9	24	1		1	3	135
Meagher						1				1					2
Missoula						4			1						5
Park			1			4							1		6
Powell						24			1			1			26
Silverbow	1		1	1		7		2		1	1				14
Teton		3		2		5				1			1		12
Total	16	11	48	14	2	518	3	7	50	90	5	4	20	5	793

Table 6. Site and Feature Types By Resource Areas

Sites	Dillon Resource Area	Garnet Resource Area	Great Falls Resource Area	Headwaters Resource Area	Total Original Butte District
Alignment	11			5	16
Bison Kill	7		4		11
Cairn	34			14	48
Ceremonial	10		3	1	14
Hearth	2				2
Lithic Scatter	341	49	7	121	518
Rock Art	2			1	3
Pit or Blind	5			2	7
Quarry	34	8		8	50
Ring	48	1	2	39	90
Rockshelter	2			3	5
Trail	3	1			4
Unknown	12	1	2	5	20
Wickiup	5				5
TOTAL SITES	516	60	18	199	793
Features					
Stone Rings	370	1	2	254	627
Cairns	151		1	144	296
Alignments	30			21	51
Pits	11	1		9	121
Vision Quests	16	1	3		20
Hearths	25	1		3	29
Other	11		1	1	13
TOTAL FEATURES	714	4	7	432	1157

Figure 15: Present Resource Areas of the Original Butte District



5.2.2 Site Density and Size

Additional hypotheses were formulated regarding the intensity of occupation in different portions of the Butte District. These hypotheses might be useful for both academic investigation and management decisions. An initial glance at site totals from Data Set 1 suggests more intense activity (more sites) in the Dillon Resource Area. However, there is also more BLM land in that area, so actual site densities and site sizes are better measures of intensity than are absolute site numbers.

Table 7 presents the number of survey and sites recorded on surveyed lands for portions of the Butte District. Prehistoric site densities are highest for the Dillon Resource Area and lowest for the Garnet Resource Area. Individual county site densities in the Great Falls and Headwaters Resource Areas are often a result of very small survey samples and may not be reliable. The totals for the combined resource areas are probably more appropriate for making comparisons.

Site densities for portions of the Butte District are in line with site densities from other parts of the State. Prehistoric site densities from five large survey projects in eastern Montana have ranged from 2.0 to 7.5 sites/1,000 acres (Deaver 1983b:6-34). In general, prehistoric site densities on the glaciated prairie fall in the 5.0-7.5 sites/1,000 acres range. South of the glacial margin, densities on the prairies are lower, generally 2.0-4.0 sites/1,000 acres. The Great Falls Resource Area is largely prairie and spans both sides of the glacial margin. The prehistoric site density of 5.2 seems appropriate in this context. However, since records for the Great Falls Resource Area have been moved to the Lewistown District, it is possible that we did not include all sites in Data Sets 1 and 2. If so, this might slightly increase site density.

Site density for the Dillon Resource Area is within the range for sites on the glaciated prairie. The Dillon Resource Area is also similar to the glaciated prairie areas in that stone features are common, but that may be about as far as the comparison can be stretched. In reality, prehistoric site densities in the 6.5-7.5 range approach the maximum possible for large samples with multiple habitat types. Densities this high imply one prehistoric site for every 130-150 acres, on the average. A number of sites are larger than 150 acres and, as total site coverage on the terrain increases, there is a tendency to lump sites and, thus, damp any increases in density. Additionally, certain types of terrain simply are not very inhabitable (swamps and steep slopes) or, if used, it is unlikely that cultural remains would be visible to surveyors. As a consequence, the similarity between the Dillon Resource Area and glaciated prairie site densities probably indicates a similar extent of past activity (high), but not necessarily for similar site types or purposes.

The site density for the Headwaters Resource Area indicates a moderate level of activity. However, individual county site densities show substantial variation. Thus, the moderate density may be just an average of high, low, and moderate densities in parts of a diverse area.

The Garnet Resource Area has a relatively low site density. It is consistently low in all three counties even though the survey sample is relatively large. Indeed, over 17% of all BLM land in this resource area has been surveyed at some intensity, and a relatively low archeological sensitivity is apparent in all counties. It may be that BLM lands are not typical of the terrain or cultural patterns in this area; however, additional data sets would be necessary to address such hypotheses.

One additional measure used to compare intensity of occupation is site size. Table 8 compares mean site size for each resource area. The Dillon Resource Area not only has the highest site density, it also has the highest mean site size and clearly displays the highest archeological sensitivity, based on these criteria. The Great Falls Resource Area has a surprisingly low mean site size, but the survey and site samples are small and the area needs additional work before any clear patterns can be established. The Garnet and Headwaters Resource Areas have mean site sizes between the two extremes. The Headwaters Resource Area mean site size is the larger of the two, as is the case for site density. Thus, archeological sensitivity is greater than for the Garnet Resource Area, based on these two criteria.

Table 7. Site Densities in Counties and Resource Areas

County	BLM Surface Acres	Class II Acres Surveyed	Class III Acres Surveyed	Prehistoric Sites on Surveyed BLM Land	Site Density/ 1000 Acres Total Survey
Beaverhead	662,137	565	18,006	132	7.1
Madison	257,204	1,330	8,434	55	5.6
Total Dillon RA	919,341	1,895	26,440	187	6.6
Granite	46,620	3,799	4,635	18	2.1
Missoula	16,377		8,969	2	0.2
Powell	82,550	1,600	6,294	15	1.9
Total Garnet RA	145,547	5,399	19,898	35	1.4
Cascade	25,577		35	1	28.6
Meagher	10,613	520	280	2	2.5
Pondera	1,516				
Teton	20,306		700	5	7.1
Total Great Falls RA	58,012	520	1,015	8	5.2
Broadwater	68,011		23,936	63	2.6
Deer Lodge	6,637		700	1	1.4
Gallatin	8,681		200	1	5.0
Jefferson	98,043	1,299	4,707	26	4.3
Lewis and Clark	81,696	3,390	2,352	15	2.6
Park	12,928		685		0.0
Silver Bow	45,435		579	4	6.9
Total Headwaters RA	321,431	4,689	33,159	110	2.9
Total Butte District	1,444,331	12,503	80,512	340	3.7

Table 8. Mean Site Size in Resource Areas

	Total Sites	Total Site Area Sq. M.	Average Site Size Sq. M.
Dillon Resource Area	516	22,744,511	44,079
Garnet Resource Area	60	1,898,897	31,648
Great Falls Resource Area	18	269,208	14,956
Headwaters Resource Area	199	7,059,794	35,476
Total Butte District	793	31,972,410	40,318

5.3 Environmental Site Distribution

5.3.1 Site Types and Attributes in Landforms

Many research topics and specific hypotheses could be generated to investigate seasonal use of different elements of the environment. Unfortunately, the quality of available surface site data is inadequate to determine site functions, season of occupation, or even precise environmental placement for most sites. However, it is possible to make a few preliminary statements using site and feature type compilations in the general landform categories.

Table 9 shows the number of each site type in each landform. Table 10 shows the number of actual features by type in each landform. Both tables show that no site or feature type is restricted to a single landform. These landforms are too general, with too much internal variation, to be strongly predictive of particular site types, even assuming that site type distribution is patterned. However, a few tendencies are evident. Bison kills and stone ring sites are most common in the lowlands landform. Over 40% of the total sample of bison kills and stone ring sites occur in this single landform and together they consitute about 25% of all sites in this landform. Additionally, stone ring sites in the lowlands contain more features than in other landforms and, thus, over 54% of the stone rings are reported from the lowlands.

Other site types are more common in other landforms. Alignment, cairn, ceremonial, and quarry sites are most common in the highlands. Feature type counts show the same patterns with 49% of the total alignments, 58% of the total cairns, and 90% of the total vision quest structures reported from highland sites. The upland and highlands creekside landform shows site types similar to the dry highlands, and all ceremonial (vision quest structures) and wickiup sites are in these two landforms. However, the creekside landform has additional similarities with the lowlands landform (bison kills and stone rings), suggesting that water present in both landforms was important for these functions.

5.3.2 Site Size in Landforms

Table 11 shows mean site size for each landform. The mean sizes in the lowlands and adjacent breaks landforms are the largest. Highlands, creekside, and uplands sites have progressively smaller mean sizes. This suggests some differences in the intensity of occupation of each landform, but is not completely compatible with total number of sites for each landform. For example, highlands sites are smaller on average than lowlands sites, but there are many more sites reported from the highlands and the total site area is highest for this landform. Before definitive comparisons are possible, it would be necessary to know the extent of survey for each of the landforms. With these data, the actual percentage of site coverage for each landform could be calculated, and it would then be possible to compare the archeological sensitivity of each landform.

5.3.3 Features and Site Size By Elevation

Table 12 shows the number of features of each type and mean site size for sites in different elevational bands. Stone rings show a strong preference for lower elevations; 63% of the total stone rings occur under 5,000 ft (1,524 m), the lowest elevation category tabulated. Cairns and alignments also show a smooth unimodal distribution, peaking in the 5,001-6,000 ft (1,525-1,829 m) elevational band. Vision quest structures are most common in the 6,001-7,000 ft (1,829-2,134 m) band, but continue in smaller numbers at higher elevations. Hearths are most common from 5,001 to 7,000 ft (1,525-2,134 m). Pits and other features show no strong elevation patterns. The 96 pits in the 6,001-7,000 ft (1,829-2,134 m) band are largely the result of one large site rather than a consistent pattern.

Total site number and mean site size show consistent patterns in relation to elevation. Total site number rises in each elevational band up to a peak of 140 in the 6,001-7,000 ft (1,829-2,134 m) unit and then drops dramatically in higher bands such that only three sites are reported over 9,001 ft (2,744 m). Mean site size shows the same pattern, rising to 53,214 m^2 in the 6,001-7,000 ft (1,829-2,134 m) band and then falling at higher elevations. The over 9,001 ft (2,744 m) mean site size is a bit higher than the lower unit, but this is probably the result of a very small sample size (N=3) rather than a reversal of the trend.

Table 9. Site Types by Landforms.

Landform	Alignment	Bison Kill	Cairn	Ceremonial	Hearth	Lithic Scatter	Rock Art	Pits or Blinds	Quarry	Stone Rings	Rockshelter	Trail	Unknown	Wickiup	Total
Breaks		1	1			8			1	1					12
Highlands	6		26	11		168	1	1	27	17	3	1	4	2	267
Lowlands	3	5	4		1	113	1	1	3	37	1		2		171
Creekside	1	3	12	3	1	180	1	3	11	21		2	5	3	246
Uplands	4		5			36		1	7	12			2		67
Unknown	2	2				13		1	1	2	1	1	7		30
Total	16	11	48	14	2	518	3	7	50	90	5	4	20	5	793

Table 10. Total Features By Landforms.

Landforms	Total Sites	Number of Stone Rings	Number of Cairns	Number of Alignments	Number of Pits	Number of Vision Quests	Number of Hearths	Number of Other	Number of Total Features
Breaks	12	1	3	2	4		3		13
Highlands	267	69	171	25	16	18	7	5	311
Lowlands	171	336	32	7	1		10	3	389
Creekside	246	177	36	5	18	2	8	5	251
Uplands	67	42	11	5	81		1		140
Unknown	30	2	43	7	1				53
Total	793	627	296	51	121	20	29	13	1157

Table 11. Site Size By Landform.

Landform	Total Sites	Total Site Area M^2	Mean Site Area M^2
Breaks	12	702,874	58,573
Highlands	267	11,736,856	43,958
Lowlands	171	8,747,021	51,152
Creekside	246	8,172,583	33,222
Uplands	67	1,370,988	20,463
Unknown	30	1,161,248	38,708
Total	793	31,972,410	40,318

Table 12. Total Features and Mean Site Size at Different Elevations

Elevation (FT)	Total Sites	Number of Stone Rings	Number of Cairns	Number of Alignments	Number of Pits	Number of Vision Quests	Number of Hearths	Number of Other Features	Number of Total Features	Total Site Area M^2	Mean Site Size M^2
3001-5000	157	394	42	8	7		4	2	457	3,955,806	25,196
5001-6000	160	112	114	29	2		11	2	271	8,385,412	52,409
6001-7000	240	56	80	11	96	10	10	1	264	12,771,331	53,214
7001-8000	95	49	43	1		3	1	3	100	1,932,317	20,340
8001-9000	39	6	3		14	4		2	29	363,809	9,328
9001+	3		1		1	1			3	42,497	14,166
Unknown	99	10	13	2	1	1	3	3	33	4,521,238	45,669
Total	793	627	296	51	121	20	29	13	1157	31,972,410	40,318

The patterns seen in this table are among the strongest in any comparisons presented thus far, but several known biases reduce the strength of interpretations drawn. The strongly patterned distribution of stone rings is probably partly the result of a preference for level lowlands locations which generally occur at lower elevations. However, stone rings are also more common on the eastern side of the District (in and adjacent to the prairie) which is generally lower (under 5,000 ft/1,525 m).

The second major bias involves total site numbers in the various bands. In this sample, the total site number peaks in the 6,001-7,000 ft (1,829-2,134 m) band, but this is strictly an absolute number, not a density, and indeed, may reflect only intensity of survey, not intensity of prehistoric occupation. Additionally, BLM lands may not be representative of the total landscape at all elevations. In particular, BLM lands in low valleys are often the drier spots, while more productive spots are privately owned and at higher elevations BLM lands often support less timber than Forest Service lands.

The final caution with using data in the elevational units involves applying broadly derived patterns to narrowly defined areas and the use of absolute elevation. These data suggest that, on BLM lands across the Butte District, stone rings tend to occur more often at lower elevations than cairns, alignments, or vision quest structures. This seems to be a defensible pattern based on other tables (landforms and counties). However, the table also implies that 63% of the stone rings occur from 2,001-5,000 ft (915-1,524 m), 19% occur from 5001-6000 (1,525-1,828 m), and the remaining 18% are still higher. This "pattern" is appropriate only for the entire Butte District, not for smaller units. In some locations, such as on the east side of the District, there are few elevations of 5,000 ft (1,525 m) and most stone rings are much lower. In other parts of the District, as in southern Beaverhead County, the lowest elevations are in the 5,001-6,000 ft (1,524-1,828 m) band in the river valley lowlands. In general, stone rings tend to occur most often at lower elevations within a given area, not at a particular absolute elevation.

5.4 Temporal Site Distribution

5.4.1 Diagnostics Reported and Reviewed

A total of 413 projectile points and ceramics were reported on site forms from BLM sites in the Butte District. Table 13 shows the breakdown by temporal periods and resource areas and it is a compilation of data from Appendix II. The sample contains 110 point fragments that were not assigned to a particular affiliation; thus, a total of 303 "diagnostics" were reported.

The sample is dominated by diagnostics from the Dillon Resource Area (N=202) and the Headwaters Resource Area (N=89), with few or no time indicators from the other resource areas. Pelican Lake (or Late Archaic, Elko Eared, Harder, and so on) is the best represented temporal period in all resource areas. Old Women's (Late Side-Notched, Desert Side-Notched, and so on) is the second most common temporal period in all areas. These two phases combined account for over 57% of all points reported on site forms. Early Archaic (Bitterroot and Mummy Cave) and Avonlea points were reported only from the Dillon Resource Area, but the sample is too small to show definite distributional patterns. Other temporal units are represented by relatively small but uniform samples across the District. Indeed, one of the most striking aspects of Table 13 is the diversity of diagnostic types in all resource areas. Even the Garnet Resource Area, with only 12 reported diagnostics, was occupied during eight different intervals.

A second interesting pattern in the temporal distribution of reported points involves the Paleoindian period. No Early Paleo points (Clovis or Folsom) were reported on any of the site forms. However, Middle Paleo (Hell Gap, Agate Basin, Haskett, and so on) and Late Paleo (Plano, Alberta, Scottsbluff, Eden, and so on) points are reported from three resource areas. Twenty-six of the 303 reported diagnostics were typed as Middle or Late Paleo. This is a relatively high percentage when compared to the adjacent prairie portions of Montana.

A second data set of projectile points and ceramics was provided by the review of collected and excavated diagnostics. All of these were examined by Ken Deaver and Stephen Aaberg and assigned to specific types as possible. Table 14 shows the breakdown by types and resource areas. A total of 321 of the 538 items reviewed could

Table 13. Affiliations of Points and Ceramics Reported on Site Forms.

	Dillon RA	Garnet RA	Great Falls RA	Headwaters RA	Total Original Butte District
Early Paleo					0
Middle Paleo	6	2		3	11
Late Paleo	11	1		3	11
Bitterroot/Mummy Cave	4				4
Oxbow	9	1		2	12
McKean	17	1		3	21
Duncan	19	1		8	28
Hanna	4	1		1	6
Pelican Lake	63	3		37	103
Besant/Samantha	9			7	16
Avonlea	5				5
Old Women's	46	2		23	71
Late Ceramics	6			1	7
Protohistoric	3			1	4
Indeterminant	99	1	2	8	110
Total	301	13	2	97	413

Table 14. Affiliations of Reviewed Projectile Points and Ceramics

	Dillon RA	Garnet RA	Great Falls RA	Headwaters RA	Total Original Butte District
Agate Basin	1				1
Hell Gap	2			1	3
Eden/Scottsbluff	1			1	2
Plano/Late Paleo	9	1		1	11
Pryor Stemmed	1				1
Bitterroot	2			2	4
Mummy Cave				1	1
Early Corner Notched	5	2		2	9
Oxbow	7	2		2	11
McKean	3	2		3	8
Duncan	15			4	19
Hanna	7	2		3	12
Pelican Lake	58	1		57	116
Besant/Samantha	3			6	9
Avonlea				4	4
Old Women's SN/CN	27	3		47	77
Old Women's Tri-Notched	10			3	13
Old Women's Unnotched	8			6	14
Late Period Ceramic	3			1	4
Protohistoric	2				2
Indeterminant	137	7		73	217
Total	301	20		217	538

be assigned to a particular time unit or type. There is some overlap between diagnostics reported and diagnostics reviewed data sets, but the items which appear in both sets were often placed in different time units.

Table 14 contains a few additional time units and point types not used in the diagnostics reported compilation, but generally the two tables are quite similar. Again, Pelican Lake is the most common type in the reviewed sample, followed by Old Women's (side-notched, corner-notched, tri-notched, and unnotched) varieties. Again, all three resource areas with reviewed points show diverse occupations from Paleo to Old Women's, even in small samples. Again, no Clovis or Folsom points were present, but Paleo points are well represented (6% of the total sample).

The reviewed diagnostics sample reinforces a few weak patterns present in the reported sample, but it also contains a few additional patterns. The Besant/Samantha and Avonlea types or phases are sandwiched temporally between the two best represented time periods, but neither is particularly common in the Butte District. Besant points are more common than the Avonlea variety, but both are surprisingly rare considering the number of points from the preceding and following periods. Duncan points are more common than the Hanna variety in both samples. Early Archaic (Bitterroot, Mummy Cave, and so on) points are not common in either sample, despite the relatively high percentage of Paleo points and the consistent representation of Middle Archaic (Oxbow, McKean, Duncan, and Hanna) material. Protohistoric diagnostics are rare, as they are throughout Montana and adjacent areas.

The distribution of Old Women's point types shows some spatial patterning in the reviewed sample. Side and corner notched Old Women's points are most common in the Headwaters Resource Area where they account for about one third of the reviewed diagnostics from that resource area. In the Dillon Resource Area, they represent only 16% of the diagnostics. The tri-notched varieties show the opposite distribution, being more common in the Dillon Resource Area. The unnotched types are about equally common in each area.

5.4.2 Lithic Materials of Reviewed Diagnostics

Table 15 shows the breakdown of lithic material types for points from each period and type and also the totals for each resource area. These figures suggest definite preferences for particular raw materials. Chert/chalcedony, obsidian/ignimbrite, and basalt are the most common materials and the only types with large enough samples for comparisons. Paleo points were mostly made of basalt (50%) and chert/chalcedony (39%). Only one obsidian/idnimbrite Paleo point (5%) appeared in the reviewed sample. Early Archaic points follow approximately the same pattern. Middle Archaic points (Oxbow through Hanna) indicate a preference for obsidian/ignimbrite (40%) over chert/chalcedony (30%) and basalt (20%). The pattern is reversed for Pelican Lake points with 47% chert/chalcedony, 25% obsidian/ignimbrite, and 18% basalt. The few Besant points are mostly obsidian/ignimbrite and basalt, while most of the rare Avonlea points are chert. Old Women's side- and corner-notch points show material types similar to Middle Archaic types (35% chert/chalcedony, 42% obsidian/ignimbrite, and 18% basalt), but the other Old Women's types are very different. The tri-notched varieties are dominated by obsidian/ignimbrite (77%), while the unnotched varieties are equally dominated by chert/chalcedony (79%).

These figures are interesting when compared to material types reported by other researchers. Davis (1972) found very different patterns in the occurrence of obsidian across periods. He found 11.19% obsidian points in the Early period, 64.42% in the Middle period, and 24.93% in the Late period. He noted the greatest intensity of obsidian use during the Pelican Lake phase. The reviewed diagnostics sample indicates 5% obsidian/ignimbrite in the Early period, 28% overall in the Middle period, and 40% in the Late period, with Pelican Lake points showing a noticeable decline in the popularity of obsidian/ignimbrite.

Napton (1966) noted a very high percentage use of obsidian/ignimbrite in Late period bison kills in Gallatin and Park Counties. His figures indicate that about 60% of the side-notched Old Women's points were made of obsidian/ignimbrite. The reviewed diagnostics sample has a smaller (42%) percentage of obsidian/ignimbrite side- and corner-notched Old Women's points.

The three resource areas show somewhat different patterns of lithic material use. The Dillon Resource Area contains ignimbrite quarries and, not surprisingly, the greatest number of points were made of obsidian/ignimbrite, followed by chert/chalcedony and basalt. The Headwaters Resource Area produced more chert than obsidian

Table 15. Material Types of Reviewed Diagnostics.

	Material Type								
	Chert/ Chalcedony	Obsidian/ Ignimbrite	Basalt	Quartzite	Andesites	Siltstone/ Porcellanite	Rhyolite	Unknown	Total
Middle Paleo	2		2						4
Late Paleo	5	1	7			1			14
Bitterroot/ Mummy Cave	2	1	2						5
Early Corner Notched	4		5						9
Oxbow	4	5	2						11
McKean	5	1	2						8
Duncan	3	10	5		1				19
Hanna	3	4	1		1			3	12
Pelican Lake	54	29	18	3	1			11	116
Besant/Semantha	1	3	4					1	9
Avonlea	3		1						4
Old Women's SN/CN	27	32	14					4	77
Old Women's Tri-Notched	3	10							13
Old Women's Unnotched	11	2	1						14
Indeterminant	72	79	41	3	1	1	1	19	217
Total	199	177	105	6	4	2	1	38	532
Dillon RA	103	123	61	5	2	2			296
Garnet RA	5	3	10		1		1		20
Headwaters RA	91	51	34	1	1			38	216
Total	199	177	105	6	4	2	1	38	532

points and basalt is again the third most common type. The Garnet Resource Area contains several chert quarries, but exactly half of the reviewed points are basalt, followed by chert and a few obsidian examples. This may be due to a very small sample size rather than to a preference for basalt.

5.4.3 Radiocarbon Dates

The compilation of radiocarbon dates (Davis 1982) contains 86 dates from the Butte District which were not rejected as unreliable by original researchers. Most of the dates are from Lincoln County in the Garnet Resource Area and various projects in the Headwaters Resource Area. Only a few of the dates are from sites on BLM land. Table 16 shows the breakdown of dates by resource areas and 400-year intervals. It also contains corrected dates when possible and is presented as years B.P.

Overall, the radiocarbon dates tend to be most numerous from later time periods (post-4,000 B.P.). However, virtually all time intervals are represented, and the Dillon and Headwaters Resource Areas show substantial temporal diversity of occupations. There is a stronger clustering of late dates (post-3,200 B.P.) in the Garnet Resource Area, but this is almost entirely the result of work along the Kootenai River in Lincoln County and occupation of this canyon is not representative of the entire resource area.

Data in Table 16 suggest that the Butte District was occupied during both warm and cool and wet and dry periods. Whereas dates from drier periods are less common on the prairies, 11 of the 86 dates (13%) equate with the Atlantic Climatic Episode (Altithermal) and other dry periods such as the Scandic and Pacific are also well represented. Likewise, cooler periods, particularly cooler and wetter periods such as the Sub-Atlantic, show strong occupation (19 dates or 22%) despite the logical increase in winter snowfall.

Table 16. Radiocarbon Dates From the Butte District

Time Span (corrected date, years B.P.)	Number of Accepted C-14 Dates				
	Dillon RA	Garnet RA	Great Falls RA	Headwaters RA	Total Original Butte District
0-400		4		4	8
401-800		7		3	10
801-1200	2	4		1	7
1201-1600		3		5	8
1601-2000		1		1	2
2001-2400				5	5
2401-2800		3		6	9
2801-3200		4		2	6
3201-3600				6	6
3601-4000		1	1	3	5
4001-4400					
4401-4800	1				1
4801-5200				2	2
5201-5600		1		1	2
5601-6000				2	2
6001-6400	2			1	3
6401-6800				2	2
6801-7200				1	1
7201-7600					
7601-8000	1				1
8001-8400				1	1
8401-8800	1			1	2
8801-9200		1			1
9201-9600				1	1
9601-10,000		1			1
Total	7	30	1	48	86

5.4.4 Summary and Speculations

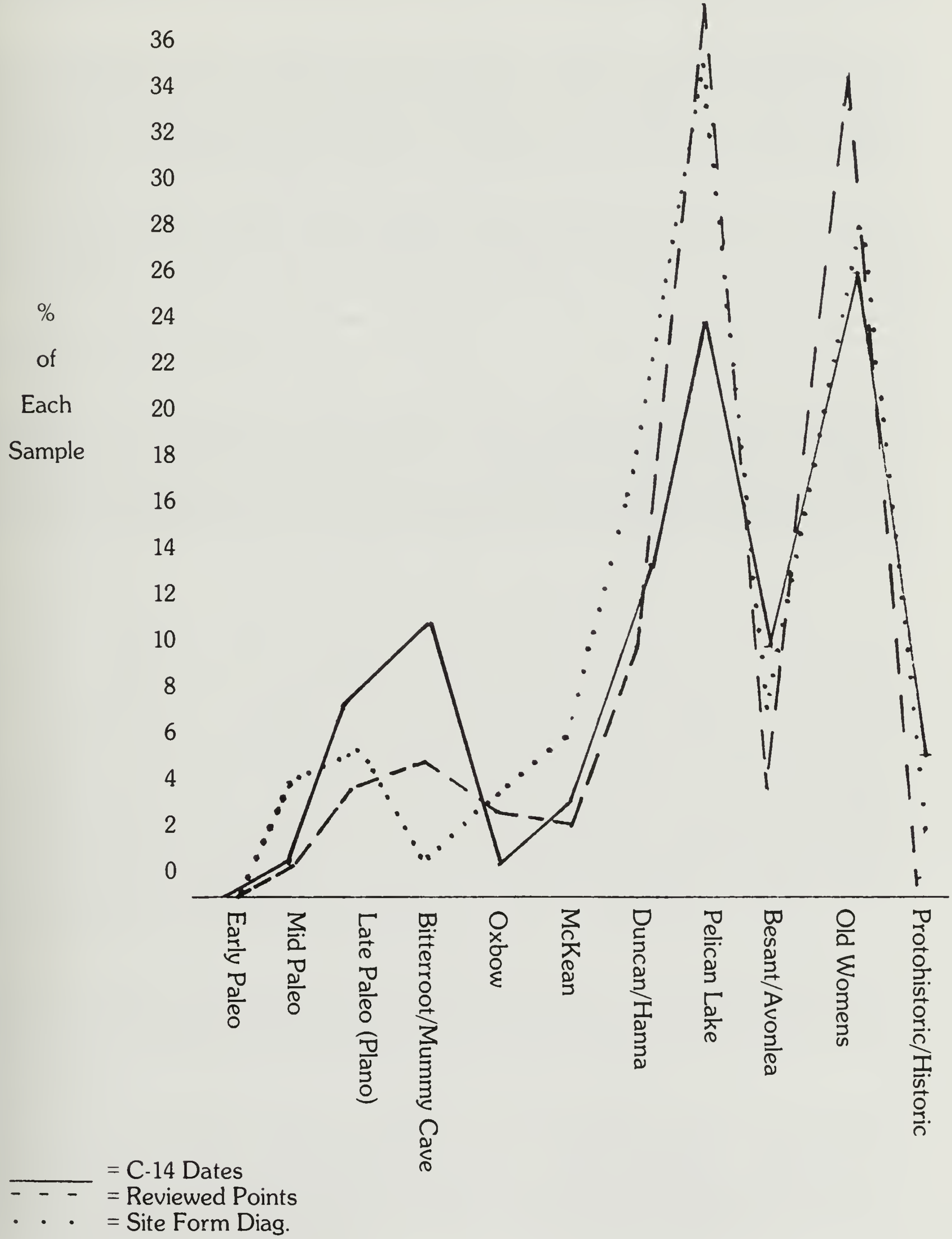
The data from the diagnostics reported, diagnostics reviewed, and radiocarbon date samples indicate similar patterns of occupation in the Butte District. These patterns are not entirely obvious in all samples because of different units of classification. Figure 16 converts all diagnostics and dates to 11 temporal units (expressed in terms of the Northwestern Plains chronology) and graphs the percentage occurrence of each unit within each of the temporal data samples.

All of the samples show similar graphed lines. No sample indicates occupation during Early Paleo (Clovis or Folsom) times. A few such sites were reported from the Butte District, but were too rare to show up in samples used in this report. Figure 16 indicates increasing occurrences of Mid and Late Paleo dates and points and further increases through the Bitterroot unit in two samples. All samples show a decline/scarcity during Oxbow or McKean times and then an extremely sharp increase through Duncan/Hanna, culminating in a peak during Pelican Lake. Likewise, all three samples show a sharp drop in Besant/Avonlea, followed by a sharp increase during Old Women's and finally a very sharp drop in the Protohistoric.

It is unusual to find three different data sets in such close congruence. The two diagnostics data sets do show some overlap, but although a number of points were typed differently between the two sets, the patterns are still very similar.

Individual points were often typed differently by researchers, and this is a particular problem in the Butte District where many points are within the normal range of variation for Northwestern Plains, Basin, and Plateau types. Point typologies are less than perfectly established, and, in particular, the Pelican Lake type is something of a catchall for most, if not all, corner-notched points. This might logically create an artificially high percentage of "Pelican Lake" points, but it cannot explain the parallel increase in radiocarbon dates from this same period. In

Figure 16: Comparison of Temporal Data from Three Samples



general, it is difficult to explain away the congruence of the three samples. It is possible to use the patterns to formulate hypotheses based on the assumption that higher percentages of points and dates from various periods translate into more intense occupation of the District.

The patterns displayed in Figure 16 suggest the hypothesis that three peaks of occupation intensity occurred in the Butte District, each followed by a decline in activity. The first minor occupation peak occurred during Late Paleo or Bitterroot. Some of the increase in Mid and Late Paleo points and dates in the three samples can be explained by "Paleo Fever," which has caused some archeologists to spend a disproportionate amount of their time and effort on older sites. However, the gradual increase through the Paleo units, and perhaps through Bitterroot, may indicate that the Butte District was an attractive place to be during gradually warmer and drier conditions.

The next two major peaks, during Pelican Lake and Old Women's, are not unique to the Butte District. The same pattern was noted for northeastern Montana (Deaver 1983a). Roll (1982:5.23) also noted a substantial increase during Pelican Lake (his Kavalla phase) times and sustained higher numbers of points through Old Women's (his Yarnell phase) for Kootenai River sites. The initial increase during Pelican Lake may be the result of wetter conditions on the prairie and, thus, a higher carrying capacity for bison and bison hunters. In the mountains, cooler conditions during Pelican Lake may have created much more winter snowfall, forcing deer into more convenient winter valley concentrations and leading to an increasingly successful subsistence adaptation. The mountain adaptation could have continued through subsequent warm/drier and warmer/wetter periods. However, the prairie bison hunting adaptation would have suffered during the warmer drier Scandic Climatic Episode and this may account for reduced Besant/Avonlea occupation. The following Neo-Atlantic Climatic Episode (Old Women's occupation) was warmer and wetter and ideal for bison and bison hunters. If this hypothesis is valid, the prairie/bison adapted populations to the east and south of the District should show a greater decline in activity during the Scandic than did forest/deer adapted populations in the north and west of the District. At the moment, the data are insufficient to adequately test this hypothesis. Future work could easily generate such needed information.

PART VI. SYNTHESIS

6.1 Introduction

Throughout this survey of the cultural resources of the Butte District, we have noted two recurrent factors: the mosaic nature of the physical and cultural environment and the characterization of the District resource base as high diversity but low density. It is these two variables that allow for the combination of the disparate data bases—environmental, ethnographic, and archeological—into a coherent whole. The purpose of this synthesis is threefold. First, it summarizes District prehistory. Second, it provides an overview of District resources. Third, it provides a framework for the definition and evaluation of zones of archeological sensitivity. These zones are significant because they can be used by land managers to evaluate and compare cultural resources. Furthermore, these same zones and the data on which they are based can help channel traditional problem-oriented archeology toward specific empirically verifiable hypotheses of regional archeological significance.

6.2 District Prehistory

In this summary of District prehistory, the major characteristics of each period are noted first. Then each resource area is addressed. The rationale for this approach is twofold. First, for management purposes, differences as well as similarities between resource areas are significant. Second, the mosaic nature of the physical and cultural environment makes these divisions archeologically relevant. It should be noted, however, that the diversity of resources available in the District as a whole acts, to a certain extent, as a leveling factor (intervening variable) on environmental and related cultural changes through time in resource areas west of the Continental Divide.

Early Paleoindian Period. No sites of this period have been documented on BLM lands within the Butte District. Surface finds of Clovis and Folsom points were reported from lands within the District, especially around Great Falls (e.g., Shumate 1962). Frison (1978) has suggested that all Paleoindian cultures in mountainous areas can best be understood as generalized foragers, as opposed to exclusively specialized big game hunters. This view is consistent with environmental characteristics noted for the Butte District, i.e., high species diversity but low density of any particular species. Therefore, we suggest that any Early Paleoindian period sites found in the mountainous terrain of the District will reflect a broad-spectrum hunting and gathering strategy, while those found in the area east of the Continental Divide at lower elevations in grasslands ecozones will be characterized by a specialized big game hunting adaptation. Given the lack of documented sites of this period on BLM lands within the District and the low density of these sites in general, we do not anticipate that large numbers of such sites will be detected by future work. Any Early Paleoindian period sites discovered on Butte District BLM lands (assuming site integrity is sufficient to allow for systematic investigation) will be significant for two reasons: (1) simply because they will be rare examples of a relatively little known period in regional prehistory and (2) because they will allow for the testing of the time depth of a generalized foraging economy in the mountains and the significance of the contrast (if any) between mountain and grasslands oriented adaptations during this period.

Two sites ascribed to the Early Paleoindian period from the Butte District have been systematically investigated. The Anzick site, 24PA506, an apparent Clovis burial, was badly disturbed by earthmoving machinery (Frison 1978). Grave goods include red ochre and over 100 stone and bone artifacts (Lahren and Bonnichsen 1974). The MacHaffie site, 24JF4, contained an undated Folsom component which includes utilized bison and other faunal materials (Forbis 1955).

Middle and Late Paleoindian Period. Site data reviewed here indicate a slight rise in population density during this period, which is characterized by warming and drying conditions. Preferred materials for projectile points appear to have been basalt and cryptocrystallines. This probably corresponds to Malouf's undated first horizon (1957). Points from both the Middle and Late Paleoindian periods are reported from all resource areas in the Butte District where they represent 9-11% of the reported diagnostics. This is a relatively high percentage when compared to the prairie portions of Montana.

Two sites within Headwaters Resource Area boundaries, 24PA504 (Myers-Hindman) and 24JF4 (MacHaffie), have Late Paleoindian components that were excavated (Lahren 1976, Forbis 1955). Both contained Scottsbluff points as well as other forms characterized by parallel oblique and/or parallel transverse flaking (Frison 1978). The Indian Creek site (24BW626), presently being excavated by Les Davis of Montana State University, was definitely occupied during this time span.

Middle and Late Paleoindian period sites, as noted earlier, are relatively common in the Butte District as compared to the prairie provinces. Therefore, continuing documentation of these sites may yield significant information about habitat/terrain preferences (site distribution) in this period. The increase in intensity of occupation in the Butte District during this period may be a result of grassland-based peoples retreating to the upland biotopes in a period when warm and dry conditions reduced the carrying capacity of the adjacent grasslands. As noted in Part V, it may represent the first of a series of episodic changes in population density, related to habitat preference, that can be tied to episodic climatic change. We suggest, however, that a significant segment of the population may have been indigenous. MacHaffie was occupied in both the Early and Middle/Late Paleoindian periods and the Indian Creek site may also have been. One interpretation of the reuse of these localities is that a locally adapted population continued to reuse a favored locality throughout the Paleoindian period.

Early and Early Middle (Archaic) Period. Our data indicate a decline in intensity of occupation during this period. Material type preferences for the Early Archaic parallel those of the previous period. Points from this period are found throughout the Butte District. Few Oxbow and McKean sites are known from the Butte District.

The Bristow phase, as defined by Roll (1982), is roughly equivalent to Oxbow. In the Kootenai Canyon locality, the Bristow phase is pervasive but poorly understood. Little is known about the artifact inventory other than that Oxbow points were used. Sites tend to be found in eroded terraces of Lake Koocanusa at or near maximum pool (2,400-2,450 ft a.m.s.l.). However, it is not clear whether this is a function of settlement preference, sampling error, or differential preservation (Roll 1982:5.10-5.11).

Site 24CA74 on the Sun River has an Oxbow component. Systematic excavations at this site indicated that inhabitants during the Oxbow phase tended to exploit locally available lithic sources as opposed to more distant quarries. Subsistence, based on faunal remains, seems to have involved the systematic exploitation of pronghorn ca. 5,200 B.P., changing to 65% bison, 21% pronghorn ca. 4,000 B.P., and shifting to a total dominance of bison ca. 3,500 B.P. The site has been interpreted as a site reused seasonally (in the fall) to accumulate winter stores. "Occupation of the site in the fall was in response to congregation of large herbivores during the breeding season. Several families probably came together to exploit these resources" (HRA 1983:8-25).

Middle Middle and Late Middle (Archaic) Period. Site data reviewed here show an increasing intensity of occupation in the District in Duncan/Hanna and peaking in Pelican Lake. Duncan/Hanna are characterized by material type preferences centered on igneous materials (obsidian and ignimbrite), followed by cryptocrystallines and then basalt. This is reversed in Pelican Lake where projectile points were primarily made of cryptocrystallines, followed by obsidian/ignimbrite and basalt. This span of time is characterized by wetter climatic conditions. In terms of the grasslands, this would have increased carrying capacity. In terms of the transmontane areas, increased precipitation no doubt led to heavier snowfall. This may have forced game, e.g., deer, elk, and so on, lower for longer periods of time, making them more easily accessible to local hunters and gatherers.

The Calx phase, which incorporates both McKean and Duncan and Hanna points, appears to be much more common than the previous Bristow phase in the Kootenai Canyon locality (Roll 1982:5.12). The Kavalla phase (Pelican Lake) in this area is characterized by points that fall within the range of variation for the Plateau Harder type and the Plains Pelican Lake type. Further, it is the first appearance of notched pebbles (Roll 1982) which are generally interpreted as net sinkers. As shown in Part III, the net sinkers may be evidence of fishing or "birding."

The Pelican Lake component at 24CA74 in the Great Falls Resource Area is characterized by seasonal exploitation (late winter and early spring) of local bison. Stone-boiling pits were interpreted as cooking pits, and population size was estimated at 25-50 people (HRA 1983:8-25).

Late Prehistoric Period. At the beginning of this period (Besant/Avonlea phases), our data indicate a decrease in the intensity of occupation in the Butte District. Material type preferences are difficult to trace due to the very small sample. Based on extremely limited data, it appears that Besant peoples in the Butte District habitually used ignimbrite/obsidian and basalt for projectile points, while Avonlea peoples used cryptocrystallines.

In the LAURD sequence, there is no apparent decrease in the intensity of occupation in the Stonehill (Besant) or Warex (Avonlea) phases. This, in combination with the developing warmer/drier conditions of the Scandic Climatic Episode, led us to suggest that the intensity of occupation decreased during the Avonlea/Besant phase east of the Continental Divide, within the District but not west of it. The drier conditions apparently had a more significant impact on populations in the grasslands exploiting bison than on those in the transmontane areas exploiting deer. This is, perhaps, one example of the flexibility/stability principle discussed in Parts I, III, and IV. The Antonsen site (24GA660) may provide a more complete picture of the grasslands bison adaptation in the District during the Besant phase can be explicated (cf. Zeier 1975; Davis and Zeier 1978).

The Old Women's phase is marked by a dramatic increase in intensity of occupation in the District. Material type preferences and projectile point styles exhibit regional variation. Side- and corner-notched Old Women's points are most common in the Headwaters Resource Area, the tri-notched variety in the Dillon Resource Area, and the unnotched variety is equally distributed in both areas. Tri-notched points are predominantly obsidian and unnotched varieties are cryptocrystallines, with side- and corner-notched varieties approximately equally distributed between igneous material types (42%) and cryptocrystallines (35%), with the remainder basalt (18%).

Once again, the apparent increase in intensity of occupation during this phase is really only relevant to that part of the District east of the Continental Divide. Roll's LAURD data indicate a constant intensity of occupation from Kavalla/Pelican Lake to Yarnell/Old Women's phases. This suggests that the less mountainous grasslands areas increased in carrying capacity in response to warmer wetter climatic conditions, hence allowing for increasing intensity of occupation in grasslands areas within District boundaries. Thus, again we postulate a locally adapted broad-spectrum hunting and gathering population utilizing the transmontane areas of the District, periodically augmented by groups oriented toward exploiting a grasslands habitat. There is no apparent shift in subsistence strategy between the Middle and Late periods, as indicated in the LAURD sequence and at the Pilgrim site southwest of Townsend (Roll 1982; Davis et al. 1982).

The Myers-Hindman site, 24PA504, contains the earliest dated pottery from the Northwestern Plains (Frison 1978). Impressionistically, it seems that there are more ceramics-bearing sites in the southern half of the District. As noted in Part III, we did not ascribe this to "outside influences," but rather we postulate that, like the distribution of ground stone tools, the distribution of ceramics may be a function of either a more sedentary population or of a population using a scheduled seasonal round whereby the same exact localities were reused many times. Either pattern would account for this distribution of high-energy investment/low-portability artifacts.

The Protohistoric Period. Almost nothing is known about this period. Only a few sites containing items of Euroamerican origin were documented. Therefore, like their counterparts on the other end of the sequence, any sites of this period (assuming sufficient integrity to allow for systematic investigation) will be of significance if for no other reason than for their extreme rarity.

6.3 Butte District Cultural Resources

6.3.1 Archeological Sensitivity

Seven hundred ninety-three prehistoric sites were recorded on Butte District BLM lands. Of the approximately 1,444,431 acres, 93,015 acres or 6.4% were surveyed at the Class II or III level. From surveyed lands, 340 prehistoric sites are known. District-wide site density is 1/273 acres. If this figure were representative of the entire District, we would anticipate a minimum of 5,290 prehistoric sites in the District. We know, however, that the District is a mosaic of diverse environmental and cultural adaptations. As a consequence, the "District average" is misleading. Based on current data, it appears that site density, site type, and site size vary widely between and across resource areas. The only similarities shared by the resource areas are as follows: (1) each exhibits wide temporal diversity of occupation, (2) mean site size and site density increase in relation to rising elevation up to 1,829-2,134 m

(6,001-7,000 ft) then drops, and (3) lowland landforms account for most stone rings and bison kills, highlands landforms for alignments, cairns, vision quest structures, and quarries; and highland creek landforms having attributes of both the highlands and lowlands have the widest diversity of site types.

The Dillon Resource Area contains 516 known prehistoric sites on BLM land and 187 from the 28,335 acres or surveyed BLM land (site density = 6.6/1,000 acres or 1/151 acres). It is characterized by a wide variety of site and feature types. Thirteen percent of the sites are those generally associated with a Plains/open grasslands adaptation and 7% are quarries. The Dillon Resource Area has the highest site density and the highest mean site size and therefore displays the highest archeological sensitivity, based on these two characteristics.

The Garnet Resource Area contains 60 recorded prehistoric sites on BLM lands, 35 on 25,297 acres of surveyed BLM lands, yielding a site density of 1.4/1,000 acres (1/714 acres). In terms of site type, it is strongly dominated by lithic scatters and quarries. Feature sites are rare. The Garnet Resource Area has the lowest site density and a medium range site size. Therefore, it is characterized as having relatively low archeological sensitivity.

The Headwaters Resource Area contains 199 known prehistoric sites on BLM lands, 110 of which are on 37,848 acres of surveyed lands (site density = 2.9/1,000 acres or 1/344 acres). The Headwaters Resource Area has a disproportionate number of stone ring and cairn sites, but relatively few quarry sites. It has the second lowest site density and a moderate site size and therefore has the second lowest archeological sensitivity rating based on the current data base. It should be noted, however, that part of archeological sensitivity is a function of questions asked. Researchers particularly interested in stone ring sites might well give this resource area a high rating. Our measures of archeological sensitivity, site density, and mean site size are useful in particular contexts, e.g., land management strategies and site distribution studies, but in no sense do we regard them as absolutes or definitive criteria.

The Great Falls Resource Area has the second highest archeological sensitivity rating by our criteria. It contains 18 known sites on BLM lands and eight from the 1,535 acre survey sample, yielding a site density of 5.2/1,000 acres (1/192 acres). Plains site types are well represented, but sample size limits even this tentative characterization. Mean site size is the lowest for any resource area, but the sample of sites and surveyed area are so small that it is difficult to judge the significance of this information. In summary, the resource areas can be ranked in terms of relative archeological sensitivity as follows: (1) Dillon, (2) Great Falls, (3) Headwaters, and (4) Garnet.

6.3.2 Management Indices

In an effort to systematize cultural resource management priorities from a land manager's point of view, we developed a series of management indices: Site Management Index (SMI), Land Survey Index (LSI), Index of Past Work (IPW), and a Gross Land Index (GLI). Each was calculated as follows:

SMI = number of known sites on BLM lands within the resource area divided by the potential number of sites on BLM lands in that resource area (total average of BLM land divided by site density)

LSI = total acres of BLM land surveyed divided by the total of BLM acreage in the resource area

IPW = amount of surveyed lands in a resource area divided by the total amount of surveyed lands for the District

GLI = total BLM land in the resource area divided by the total of BLM land in the District

We calculated these indices for the four resource areas on the basis of the following values:

Resource Area	Known Sites	Acres Surveyed	# Sites Surveyed Land	Site/Acres[1]	Acres in RA	Extrapolated # Sites
Dillon	516	28,335	187	151	919,341	6,088
Garnet	60	25,297	35	714	145,547	203
Headwaters	199	37,848	110	344	321,431	934
Great Falls	18	1,535	8	192	58,012	145
TOTAL	793	93,015	340		1,444,431	7,370

Results are shown as follows:

	SMI(%)	LSI(%)	PWI(%)	GLI(%)
Dillon	8.4	3	30.4	63.6
Garnet	29.5	17.3	27.1	10
Headwaters	21	11.7	40	22
Great Falls	12	2.6	1.6	4

The Dillon Resource Area, to which we attributed the highest archeological sensitivity, has the lowest SMI, which means that the least is known about the site universe in that resource area and it competes with the Great Falls Resource Area for the lowest survey index, indicating that a relatively small sample of the BLM lands has been checked for archeological resources. The GLI indicates that most of the District lands are concentrated in this resource area and the PWI that less than one third of past efforts at systematic reconnaissance were focused on this resource area.

The Garnet Resource Area, which has the lowest index of archeological sensitivity, has the highest SMI and LSI, indicating that the most is known about the potential site universe and the highest percentage of BLM lands were surveyed in this resource area. It has received approximately the same amount of attention in past survey work as the Dillon area, but it contains only 10% of the BLM lands in the District.

The Headwaters Resource Area contains 22% of the BLM lands in the District, 11.7% of which were systematically surveyed. Similar to the situation in the Garnet Resource Area, a disproportionate amount of past work was focused on this resource area. Not surprisingly, the SMI is also relatively high, indicating that a relatively high sample of the site universe of BLM lands was recorded. The Headwaters Resource Area has a relatively low site density, a moderate mean site size and, thus, is the second lowest in archeological sensitivity. A wide diversity of site types is characteristic of this resource area.

Little is known of the Great Falls Resource Area. Based on a very limited sample of both sites and surveyed lands, it appears to be dominated by features and sites often attributed to a plains/grasslands adaptation. It has the lowest mean site size of any resource area. We attributed this to sampling error and, therefore, rated it as having the second highest archeological sensitivity of resource areas in the District. It has the lowest PWI and GLI indices in the District. This indicates that the least amount of BLM lands are found in this resource area and those received very little attention in the past. Furthermore, the Great Falls Resource Area has the lowest LSI and a SMI, only 2.6% points higher than the Dillon Resource Area, indicating that the least is known about the archeological site distribution on these lands in general and that only 12% of the postulated site universe has been recorded.

Thus, the two resource areas (Dillon and Great Falls) with the highest archeological sensitivity indices are the least known archeologically (SMI, LSI). Furthermore, a disproportionate amount of past work (GLI-PWI) was focused on the two resource areas of least sensitivity, Headwaters and Garnet. Based on these indices, a clear management priority for archeology is the focusing of future work in the Dillon Resource Area. This area has the most BLM lands, the highest archeological sensitivity, and is one of the least know archeologically. The secondary focus of future work, based on these indices, should be the Headwaters Resource Area. (We have deleted the Great Falls Resource Area from consideration since it is now administratively part of the Lewistown District.) The Headwaters Resource Area does have a relatively low site density, but this figure varies widely between counties. Therefore, we suggest that the high density pockets of this resource area, which according to our measures have a higher sensitivity rating than the resource area in general, should be the secondary target of future archeological research, based on management considerations. The Garnet area should be given the least emphasis.

Two intervening factors must be weighted when considering these recommendations. One is managerial and one is archeological. Some type of activity/impact index needs to be introduced into these calculations. This activity/impact index should be calculated in terms of both how extensive and intensive land impacts are expected to be. This is necessary because, for instance, multiple drill pads may constitute less impact on cultural resources than a single mine or recreational project. Oil-based activities tend to cover less acreage than either mines or campgrounds. Therefore, a useful activity index will include measures of size as well as frequency of impact. A high activity index would be another measure that could be used to focus archeological reconnaissance on a particular area. We anticipate, in fact, that, in day-to-day operations, it might override all other indices. The SMI, LSI, PWI, and GLI were really designed as tools for use in long-range planning.

A second intervening variable is simply that, as more work is done, the SMI and LSI will change. At the same time, this allows for recalculations of both site density and mean site size. As a consequence, the archeological sensitivity of particular areas may change. Furthermore, as noted earlier, the measures used to calculate archeological sensitivity in this report were based on a theoretical stance which attributes significance to site distribution vis-a-vis the environment. These are not the only measures of archeological sensitivity. Researchers concerned with particular site types would most likely rate the resource areas differently, e.g., those focusing on non-stone ring habitation sites would rate those areas west of the Continental Divide, i.e., the Garnet Resource Area, would become a major focus. Those interested in the grasslands/mountains interface would generate still another set of priorities.

6.4 Recommendations For Future Work

6.4.1 Methodological Concerns

The most obvious and immediate need is to centralize archeological data relevant to the Butte District in one repository, presumably the Butte District Office. Appendices I and II can serve as a guide for this. Sites listed in these appendices and not included in the site files of the Butte Office should be acquired.

Second, we recommend the standardization of information collected. We regard the imposition of a single research design or site form on all archeologists working in the Butte District as a sociological impossibility. However, systemization of the data base is a necessity, both for managerial and archeological purposes. This can be accomplished by requiring District archeologists working in the District to make explicit their minimal site and site type definitions. Further, they should be required to pace site dimensions and to indicate the acreage surveyed and at what intensity. We suggest that any site forms used provide the following information: (1) major ecozone, (2) immediate topographic association, (3) distance to permanent/seasonal water, (4) visibility, and (5) a list of site contents (number and type of features, diameters of stone rings and cairns, and density of lithics, ceramics, and other artifact types). This procedure would ensure comparability of the data base and hence facilitate future syntheses. Furthermore, we strongly encourage requiring the recording of acreage surveyed in each ecozone (landform/vegetation) unit.

The rationale for this recommendation is both managerial and archeological in nature. The best measure of archeological sensitivity, from a land manager's point of view, is site coverage. Site coverage is calculated by dividing the amount of acreage in a particular ecozone by the amount of acreage taken up by archeological sites in that ecozone. A landform/vegetation unit with many small sites may have a lower coverage/sensitivity rating than an ecozone with a few extensive sites. Site coverage figures will allow managers to make probability statements regarding the likelihood that a particular project would impact an archeological site. Site coverage figures will allow researchers to more accurately assess prehistoric settlement and land-use patterns. We recommend that the recording standards listed above apply to contractors working on BLM lands by including that as a stipulation in scopes of work proposals. This strategy will ensure comparability of data sets while allowing archeologists the freedom to develop their own research designs and address testable research questions, given the constraints imposed by the sites they investigate.

Based on our review of the ethnographic record, we make the following methodological recommendations:

1. Projectile point stylistic variation should not *a priori* be assumed to be temporally significant;
2. Single heat-altered lithic items should not be assumed to be the product of heat treatment of raw materials prior to the process of manufacture;
3. The systematic examination of debitage and informal tools should be emphasized when questions about site function and activity are being formed; and
4. "Intermontane Ware" should not *a priori* be assumed as evidence of Shoshonean influence.

6.4.2 Foci of Future Work

The hypotheses presented for testing in this section reflect the theoretical parameters of this study. They are part and parcel of an ecosystems perspective and draw heavily from our use of ethnographic analogy as a source of hypotheses rather than as a source of evidence. We have tried to make these hypotheses as explicit as possible so that they will provide clear foci for future work. We assume that, as more data are acquired on Butte District archeology, these hypotheses will be modified, refined, verified, or rejected, as the data dictate. We regard these hypotheses only as preliminary and provisional since they were generated on the basis of very limited data. As this data set expands, so will the research horizons in the Butte District.

HYP I: There is a random distribution between multi-occupation habitation sites and the diversity of resources available.

HYP II: There is no correlation between stability/predictability of resources and multi-occupation habitation sites.

HYP III: There is a random distribution between large feature (number of stone rings and/or number of habitation generated pits) sites and the diversity and/or stability of resources in the immediate locality.

HYP IV: There is no correlation between habitation site size (number of features) and repeated occupation events.

Hypotheses I-IV were formulated as a mechanism for exploring the relationship between and among four variables: site size/population aggregation, reuse of habitation localities/episodic siting decision regularities, the diversity of available resources, and the density of available resources. We suspect that there is no one simple relationship between these four variables. Any patterned relationship found between these variables would have regional significance by contributing to the understanding of settlement patterning. Further, it could have even broader significance when applied to other hunter and gatherer subsistence systems outside the District.

HYP V: There is a random distribution of artifacts within, between, and among habitation structures.

HYP VI: There is no correlation between the distribution of high-energy investment/low-portability artifacts (ceramics and ground stone) and multi-occupation sites.

Hypotheses V and VI focus attention on the distribution of artifacts within and between sites. In order for Hypothesis VI to be tested, workers in the Butte District will have to redirect their attention to generally ignored artifact classes such as flakes, informal tools, and debitage.

HYP VII: There is no correlation between the availability of gregarious species and site size.

HYP VIII: There is no correlation between non-mobile resources and multi-occupation sites.

HYP IX: There is a random distribution between game trails and trap and blind/pit site types.

Hypotheses VII-IX focus on questions about subsistence strategies. Gregarious species are the most cost-efficient species for man to exploit. Therefore, it seems that the availability of these types of prey will affect population size and hence site size. Ames and Marshall (1981) have indicated that, in the Interior Plateau, camas beds are predictors of village sites. Hypothesis VII tests for this relationship in the Butte District by emphasizing dense plant resources in general, not just camas.

HYP X: Lithic quarry sites show a random distribution relative to other site types within the District.

Following Kimball (1976), we suggest that hunters and gatherers will choose to utilize particular quarry sites on the basis of their relative centrality in the area that the group exploits for organic resources. If this proves correct, then we can explain why outcrops of relatively poor quality materials were heavily utilized (e.g., Schmitt), while areas with very high quality materials were ignored.

HYP XI: There is no correlation between material types utilized and phase affiliation.

This hypothesis was suggested by two observations. The first was HRA's (1983) assertion that Oxbow peoples habitually exploited local materials while Pelican Lake peoples utilized more distant quarries. The second was the difference noted within Old Women's phase point variants and the apparent correlation with different material types. We feel that material type preference was most likely affected by availability, workability, intended use, extent of energy investment in the manufacturing process, and a desire for novelty. Therefore, in order to test the hypothesis, very careful consideration of what constitutes a legitimate measure of preference will have to be made. For example, quantitative data showing an association of a particular tool type with a particular material type does not mean that that material type was habitually used for any other artifact class.

HYP XII: There is a random distribution between faunal assemblages indicating broad-spectrum hunting (multiplicity of species) and those indicating specialized hunting (overwhelming predominance of one species) and mountainous and/or grasslands terrain in all periods or any particular period.

This hypothesis focuses attention on the environmental diversity within the District and its apparent consequences for Butte District prehistory. It will allow for the testing of Frison's (1978) notion that mountainous areas have supported an Archaic adaptation throughout prehistory (including the Paleoindian period). Further, if this hypothesis is verified, then we could systematically address the thesis of this report: since grassland-based hunters were more dependent on single species, they were more susceptible to being influenced by environmental change. This led to population fluctuations (and hence explains the episodic variation in occupational intensity) in the eastern part of the District throughout prehistory. If this were verified, then "In Situ" paradigm research could be combined with "Outside Influences" paradigm research by showing that they are not, in fact, in conflict. Instead, they reflect the existence of two coterminous traditions: the locally developed stable Mountain Archaic Tradition and the grasslands/plains adaptation which fluctuates in intensity with climatic variation.

REFERENCES CITED

Aaberg, Stephen A.

1981 Plant Gathering as a Settlement Determinant at the Pilgrim Stone Circle Site. Paper presented at the 1981 Annual Plains Conference in Bismarck, North Dakota.

Allen, E.

1971 White-Tailed Deer. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 69-79. Montana Fish and Game Department, Helena.

Ames, Kenneth M., and Alan G. Marshall

1980 Villages, Demography and Subsistence Intensification on the Southern Columbia Plateau. *North American Archaeologist* 2(1):25-52.

Anastasio, Angelo

1972 The Southern Plateau: An Ecological Analysis of Intergroup Relations. *Northwest Anthropological Research Notes* 6(2):109-229.

Antevs, Ernst

1955 Geologic-Climatic Dating in the West. *American Antiquity* 20:317-335.

Arthur, George W.

1966 An Archaeological Survey of the Upper Yellowstone River Drainage, Montana. *Agricultural Economics Research Report* No. 26. Department of Agricultural Economics and Rural Sociology, Montana Agricultural Experiment Station, Bozeman.

1968 Southern Montana. In *The Northwestern Plains: A Symposium*, edited by W. W. Caldwell and S. W. Conner, pp. 51-62. Rocky Mountain College Center for Indian Studies, Billings, Montana.

Baker, F. S.

1944 Mountain Climates of the Western United States. *Ecological Monographs* 14(2):225-254.

Baker, R. G.

1976 Late Quaternary Vegetation History of the Yellowstone Lake Basin, Wyoming. *U.S. Geological Survey, Professional Papers* 729-E.

Binford, Lewis

1980 Willow Smoke and Dog's Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45:4-20.

Binford, Lewis R., and Jeremy A. Sabloff

1982 Paradigms, Systematics and Archaeology. *Journal of Anthropological Research* 38(2):137-153.

Blankinship, J. W.

1905 Native Economic Plants of Montana. *Montana Agricultural College Experiment Station Bulletin* No. 56. Bozeman.

Bliss, W. L.

1947 *Preliminary Appraisal of the Archaeological and Paleontological Resources of Tiber Reservoir, Toole and Liberty Counties, Montana.* Smithsonian Institution River Basin Survey—Missouri Basin Project—Appraisal. On file, Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

Boas, Franz

1890 The Indians of British Columbia: Tlingit, Haida, Tsimshian, Kutonaqa. *Report of the British Association for the Advancement of Science*, pp. 797-893.

1918 Kutenai Tales. *Smithsonian Institution, Bureau of American Ethnology Bulletin* 59.

Booth, W. E.
1972 *Grasses of Montana*. Montana State University, Bozeman.

Booth, W. E., and J. C. Wright
1959 *Flora of Montana, Part II*. Montana State University, Bozeman.

Borchert, J. R.
1950 The Climate of the Central North American Grasslands. *Annals of the Association of American Geographers* 40(1):1-39.

Borden, Charles E.
1956 Two Surveys in the East Kutenai Region. *Research Studies of the State College of Washington* 24(1). Pullman.

Brown, C. J. D.
1971 *Fishes of Montana*. Big Sky Books, Bozeman.

Brown, R. L.
1971 Sharp-Tailed Grouse. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 129-133. Montana Fish and Game Department, Helena.

Bryson, Reid A., David A. Baerreis, and Wayne M. Wendland
1970 The Character of Late-Glacial and Post-Glacial Climate Change. In *Pleistocene and Recent Environments of the Central Great Plains*, edited by Wakefield Dort, Jr. and J. Knox Jones, Jr., pp. 53-74. The University Press of Kansas, Lawrence.

Burt, William H., and Richard P. Grossenheider
1976 *Field Guide to the Mammals*. Houghton-Mifflin, New York.

Carlson, L. G., and M. A. Loschieder
1977 An Archaeological and Ethnohistorical Investigation of Selected Areas in Kootenai National Forest, Northwestern Montana. *Plains Anthropologist* 22(75):59-66.

Chalfant, Stuart A.
1974 Aboriginal Territories of the Flathead, Pend D'Oreille and Kutenai Indians of Western Montana (No. 61, Def. Ex. 24). In *Interior Salish and Eastern Washington Indians II*, edited by S. A. Chalfant, C. Malouf, and M. G. Burlingame, pp. 25-115. Garland, New York.

Chamberlain, Alexander F.
1892 Report on the Kootenai Indians. *Report of the British Association for the Advancement of Science* 63:549-617.

Chelini, J. M.
1965 Limestone, Dolomite, and Travertine in Montana. *Montana Bureau of Mines and Geology Bulletin* 44. Butte.

Chrest, H.
1971 White-Tailed Ptarmigan. In *Game Management in Montana*. edited by T. W. Mussehl and F. W. Howell, pp. 181-183. Montana Fish and Game Department, Helena.

Collins, Mary, and R. S. Timmons
1981 *A Cultural Resource Inventory of the Proposed Yaak Highway Improvement Project*. A Report to the Federal Highway Administration by the Kootenai National Forest.

Compton, H., J. Egan, and R. Trueblood
1971 Pronghorn Antelope. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 81-87. Montana Fish and Game Department, Helena.

Coues, Elliot (editor)

1897 *Manuscript Journals of Alexander Henry and David Thompson* (3 vols.) New York.

1965 *History of the Expedition Under the Command of Lewis & Clark*, Vol. 1-3. Dover, New York.

Coupland, Robert T.

1958 The Effects of Fluctuations in Weather Upon the Grasslands of the Great Plains. *Botanical Review* 24:274-317.

Darroch, John I.

1974 Edge-Ground Cobbles: A Discussion. *Archaeology in Montana* 15(2):52-73.

Daubenmire, Rexford

1969 Structure and Ecology of Coniferous Forests of the Northern Rocky Mountains. In *Coniferous Forests of the Northern Rocky Mountains*, edited by Richard D. Taber, pp. 25-41. Center for Natural Resources, University of Montana Foundation, Missoula.

Daubenmire, R., and Joan B. Daubenmire

1968 Forest Vegetation of Eastern Washington and Northern Idaho. *Washington Agricultural Experiment Station Technical Bulletin* 60. Washington State University, Pullman.

Davis, Emma Lou

1963 The Desert Culture of the Western Great Basin: A Lifeway of Seasonal Transhumance. *American Antiquity* 29:202-212.

Davis, Leslie B.

1972 *The Prehistoric Use of Obsidian in the Northwestern Plains*. Unpublished Ph.D. dissertation, University of Calgary, Calgary, Alberta.

1981 *Cattleguard No. 3: Intensive Small-Scale Mitigation Excavations at the South Everson Creek Chert Quarry/Workshop Site (24BE559) in Southwestern Montana*. Report by the author to the Bureau of Land Management, Butte District.

1982 Montana Archaeology and Radiocarbon Dates: 1962-1981. *Archaeology in Montana, Special Issue* No. 3.

Davis, Leslie B., Stephen A. Aaberg, and John W. Fisher

1980 *Cultural Resources in the Limestone Hills Army National Guard Training Site, Broadwater County, Montana*. Report by Montana State University to the Montana Army National Guard, Helena.

Davis, Leslie B., Stephen A. Aaberg, Michael Wilson, and Robert Ottersberg

1982 *Stone Circles in the Montana Rockies: Systematic Recovery and Culture-Ecological Inference*. Report by Montana State University to the Montana Army National Guard.

Davis, Leslie B., Donald L. Smith, Larry C. Munn, Gerald A. Nielson, Michael Wilson, and Thomas A. Foor

1978 The Schmitt Chert Mine Investigations, 1972-1978. Papers presented at the 1978 Plains Conference, Denver, Colorado.

Davis, Leslie B., and Charles D. Zeier

1978 Multi-Phase Late Period Bison Procurement at the Antonsen Site, Southwestern Montana. In Bison Procurement and Utilization: A Symposium, edited by L. B. Davis and M. Wilson, pp. 225-235. *Plains Anthropologist Memoir* 14.

Deaver, Ken

1983a Subsistence Strategy Within the Study Area. In *Archaeological Investigations on the Northern Border Pipeline Montana Segment*, Vol. 3, edited by Ken Deaver, pp. 7.1-7.47. Report by Professional Analysts to Northern Plains Natural Gas Company, Omaha.

Deaver, Ken (editor)
1983b *Site Distribution and Lithic Resource Utilization in the Powder River Resource Area, Southeastern Montana*. Report by Professional Analysts for BLM-Miles City District.

Deaver, Sherri
1983 Tipis: Distribution and Significance. In *Archaeological Investigations on the Northern Border Pipeline, Montana Segement*, Vol. 3, edited by Ken Deaver, pp. 9.1-9.43. Report by Professional Analysts to Northern Plains Gas Company, Omaha.

Dort, Wakefield, Jr.
1962 Multiple Glaciation of Southern Lemhi Mountains, Idaho—Preliminary Reconnaissance Report. *Tebiwa* 5(2):2-17. Pocatello, Idaho.

Doxiadus, C. A.
1976 *Action for Human Settlements*. Norton, New York.

Dunnell, Robert C.
1982 Science, Social Science, and Common Sense: The Agonizing Dilemma of Modern Archaeology. *Journal of Anthropological Research* 38(1):1-25.

Ebert, James I.
1979 An Ethnoarchaeological Approach to Reassessing the Meaning of Variability in Stone Tool Assemblages. In *Ethnoarchaeology*, edited by Carol Kramer, pp. 21-58. Columbia University Press, New York.

Egan, J.
1971 Mule Deer. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 53-67. Montana Fish and Game Department, Helena.

Ellison, Lincoln, and E. J. Woolfolk
1937 Effects of Drought on Vegetation Near Miles City, Montana. *Ecology* 18:329-336.

Ewers, John C.
1945 The Case for Blackfoot Pottery. *American Anthropologist* 47:2.

1955 The Horse in Blackfoot Indian Culture With Comparative Material From Other Western Tribes. *Bureau of American Ethnology, Bulletin* 159, Washington, D.C.

1958 *The Blackfeet, Raiders of the Northwestern Plains*. University of Oklahoma Press, Norman.

1967 Was There a Northwestern Plains Sub-Culture? *Plains Anthropologist* 12(36):167-174.

Eyman, Frances
1968 The Teshoa, A Shoshonean Woman's Knife: A Study of American Indian Chopper Industries. *Pennsylvania Archaeologist* 34(3-4):9-52.

Fenenga, R., and P. L. Cooper
1951a *Appraisal of the Archaeological and Paleontological Resources of the Sun River Basin, Montana*. Missouri River Basin Survey. Manuscript on file at Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

1951b *Appraisal of the Archaeological and Paleontological Resources of the Jefferson River Basin, Montana*. Missouri River Basin Survey. Manuscript on file at Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

Flint, Patricia R.
1980 Excavations at the Graybeal Site, 1979: A Preliminary Report. *Archaeology in Montana* 21(1):33-44.

1982 *The Northern Rocky Mountain Region Environment and Culture History*. Unpublished Ph.D. dissertation, University of Oregon, Eugene.

Foor, Thomas A.
1982 *Cultural Continuity of the Northwestern Great Plains—1300 B.C. to A. D. 200, the Pelican Lake Culture*. Unpublished Ph.D. dissertation, University of California, Santa Barbara.

Forbis, R. G.
1955 *The MacHaffie Site*. Unpublished Ph.D. dissertation, Columbia University, New York.

Forbis, Richard G., and John D. Sperry
1952 An Early Man Site in Montana. *American Antiquity* 18:127-133.

Foss, A., and M. Rognrud
1971 Rocky Mountain Goat. In *Game Management in Montana*, edited by T. W Mussehl and F. W. Howell, pp. 107-113. Montana Fish and Game Department, Helena.

Fredlund, Dale E., and Lynn B. Fredlund
1970 Archaeological Survey of the Forks of the Flathead River: A Preliminary Report. *Archaeology in Montana* 11(4):15-29.

1971 Archaeological Survey of the Three Forks of the Flathead River, Montana. *Archaeology in Montana* 12(2&3):1-58.

Frison, George C.
1973 The Plains. In *The Development of North American Archaeology*, edited by James E. Fitting, pp. 151-184. Anchor Books.

1978 *Prehistoric Hunters of the High Plains*. Academic Press, New York.

Fuller, E. O.
1974 The Confederated Salish and Kutenai Tribes of the Flathead Reservation. In *Interior Salish and Eastern Washington Indians III*, edited by D. G. Horr, pp. 27-168. Garland, New York.

Geertz, Clifford
1964 Ideology as a Cultural System. In *Ideology and Discontent* edited by David E. Apter, pp. 47-75. Free Press, New York.

Gill, J. R., and W. A. Cobban
1973 Stratigraphy and Geologic History of the Montana Group and Equivalent Rocks, Montana, Wyoming, and North and South Dakota. *U.S. Geological Survey Professional Paper* 776. Washington, D.C.

Gilmore, Harry C.
1953 Hunting Habits of the Early Nevada Paiutes. *American Anthropologist* 55:1.

Gilmore, Melvin R.
1977 (1919) *Uses of Plants by the Indians of the Missouri River Region*. University of Nebraska Press, Lincoln.

Gould, R. A.
1980 Beyond Analogy in Ethnoarchaeology. In *Explorations in Ethnoarchaeology*, edited by R. A. Gould, pp. 249-329. University of New Mexico Press, Albuquerque.

Grinnell, George B.
1923 *The Cheyenne Indians: Their History and Ways of Life*. University of Nebraska Press, Lincoln.

1962 *Blackfoot Lodge Tales*. University of Nebraska Press, Lincoln.

Griswold, Gillette (editor)
1953 Archaeological Sites in the Flathead Lake Region, Montana: A Symposium. *Anthropology and Sociology Papers* No. 15. Montana State University, Missoula.

Griswold, Gillette, and D. W. Larom
1954 The Hellgate Survey. *Anthropology and Sociology Papers* No. 16. Montana State University, Missoula.

Hahn, Barton E.
1973 *Flora of Montana: Conifers and Monocots*. Montana State University, Bozeman.

Hart, Jeff
1976 *Montana—Native Plants and Early Peoples*. Montana Historical Society, Helena.

Hayden, Brian
1981 Research and Development in the Stone Age: Technological Transitions among Hunters and Gatherers with *CA* comment. *Current Anthropology* 22(5):519-549.

Hellson, John C., and Morgan Gadd
1974 Ethnobotany of the Blackfoot Indians. *Canadian Ethnology Service Paper* No. 19. National Museum of Canada, Ottawa.

Herbort, Dale P.
1981 *Palmer Chert Quarry: An Examination of the Chert's Characteristics, Mechanics and Prehistoric Procurement*. Report by Mineral Research Center for Maronick Construction Company, East Helena, Montana.

Hester, Thomas R., Alan D. Albee, and Cristy Willer
1977 Lithic Analysis of a Controlled Surface Collection From a site in Western Montana. *Plains Anthropologist* 22(77):239-249.

Historical Research Associates (HRA)
1983 *Sun River (24CA74): A Stratified Pelican Lake and Oxbow Occupation Site Near Great Falls, Montana*. Report by HRA for Department of the Army, Omaha District, Corps of Engineers, Omaha, Nebraska.

Hoffman, J. J.
1969 Intermountain Pottery on Yellowstone Lake. *Archaeology in Montana* 2(34):3-7.

Hoffman, Robert S., and Donald L. Pattie
1968 *A Guide to Montana Mammals: Identification, Habitat, Distribution and Abundance*. University of Montana, Missoula.

Hogan, Bonnie H.
1969 *Two High Altitude Game Trap Sites in Montana*. Unpublished M.A. thesis, University of Montana, Missoula.

1977 An Aboriginal Burial Site Near Kalispell. *Archaeology in Montana* 18(1):1-27.

Holmes, William
1914 Areas of American Culture Characterization Tentatively Outlined as an Aid in the Study of the Antiquities. *American Anthropologist* 16(3):413-436.

Hughes, Jack T.
1948 *Supplementary Appraisal of the Archaeological and Paleontological Resources of the Tiber Reservoir, Toole and Liberty Counties, Montana*. Smithsonian Institution River Basin Project Appraisal. On file, Midwest Archeological Center, National Park Service, Lincoln.

Huscher, B. H., and H. A. Huscher
1942 Athabaskan Migration Via the Intermontane Region. *American Antiquity* 8:80-88.

Jasmann, Alice 0. "Dede"
1963 Folsom and Clovis Projectile Points Found in Southwestern Montana. *Archaeology in Montana* 5(3):10-18.

Jenness, Diamond
1960 (1932) The Indians of Canada. *National Museum of Canada, Bulletin 65, Anthropological Series* No. 15. Ottawa.

Jenni, Don
1962 Camas Creek (24SA5). *Archaeology in Montana* 4(4):9-20.

Jenni, Donald, and Sandy Jenni
1959 Camas Creek (24SA5). *Archaeology in Montana* 1(4):6-7.

1960 A Ranger Basin Campsite. *Archaeology in Montana* 2(1):2.

1962 Camp Misery Site. *Archaeology in Montana* 3(4):6.

Jochim, Michael A.
1979 Catches and Caches: Ethnographic Alternatives for Prehistory. In *Ethnoarchaeology*, edited by Carol Kramer, pp. 217-246. Columbia University Press, New York.

Johnson, Ann M.
1982 Extended Coalescent Pottery at the Horse Butte Site, West-Central Montana. *Archaeology in Montana* 23(1):1-9.

Johnston, Alex
1969 Man's Utilization of the Flora of the Northwest Plains. In *Post-Pleistocene Man and His Environment on the Northern Plains*, edited by R. G. Forbis et al., pp. 108-176. University of Calgary Archaeological Association.

Kehoe, Alice B.
1981 Revisionist Anthropology: Aboriginal North America With CA Comment. *Current Anthropology* 22(5):503-518.

Kehoe, Thomas F.
1954 Stone 'Medicine Wheels' in Southern Alberta and the Adjacent Portion of Montana: Were They Designed As Grave Markers? *Journal of the Washington Academy of Sciences* 44(5):133-137.

1960 Stone Tipi Rings in North-Central Montana and the Adjacent Portion of Alberta, Canada: Their Historical, Ethnological, and Archaeological Aspects. *Smithsonian Institution Bureau of American Ethnology, Bulletin* 173(62):417-474.

Kelly, Robert L.
1983 Hunter-Gatherer Mobility Strategies. *Journal of Anthropological Research* 39(3):277-306.

Kidwell, Arthur Spalding
1968 *The Conical Timbered Lodge on the Northwest Plains: Historical, Ethnological, and Archaeological Evidence*. M.A. thesis, University of Oregon.

Kimball, Patricia Culp
1976 Warm Creek Spring: A Prehistoric Lithic Workshop. *Archaeological Reports* No. 8. The Idaho State University Museum of Natural History, Pocatello.

Knudson, Ruthann

1983 Organizational Variability in Late Paleo-Indian Assemblages. *Washington State University Laboratory of Anthropology, Reports of Investigations* No. 60.

Koch, Elers

1941 Big Game in Montana from Early Historical Records. *The Journal of Wildlife Management* 5(4):357-370.

Kraenzel, Carl Frederick

1955 *The Great Plains in Transition.* University of Oklahoma Press, Norman.

Kroeber, Alfred L.

1902 The Arapaho. *Bulletin of the American Museum of Natural History* Vol. 18.

1940 *Natural and Cultural Areas in North America.* University of California Press, Berkeley.

Lahren, Larry A.

1976 *The Myers-Hindman Site: An Exploratory Study of Huma Occupation Patterns in the Upper Yellowstone Valley from 7000 B.C. to A.D. 1200.* Anthropologos Researches International Incorporated, Livingston, MT.

Lahren, Larry A., and R. Bonnichsen

1974 Bone Foreshafts From a Clovis Burial in Southwestern Montana. *Science* 186:147-150.

Lewis, Oscar

1942 The Effects of White Contact Upon Blackfoot Culture, with Special Reference to the Fur Trade. *Monographs of the American Ethnological Society* 6. University of Washington Press, Seattle.

Loendorf, Lawrence L.

1973 *Prehistoric Settlement Patterns in the Pryor Mountains.* Unpublished Ph.D. dissertation, University of Missouri, Columbia.

Leonhardy, Frank C., and David G. Rice

1970 A Proposed Culture Typology for the Lower Snake River Basin, Southeastern Washington. *Northwest Anthropological Research Notes* 4(1):1-29.

Lowie, Robert H.

1909 The Northern Shoshone. *American Museum of Natural History* 2(2):169-306.

1924 Notes on Shoshonean Ethnography. *American Museum of Natural History* 20:3.

Mack, Richard N.

1982 Pollen Analysis of Cores From Tepee Lake and McKillop Creek Pond, Lincoln County, Montana. In *Kootenai Canyon Archaeology: The 1979 LAURD Project Final Mitigation Report*, edited by Tom E. Roll, pp. 3.1-3.9. Report by Montana State University to the U.S. Army Corp of Engineers, Seattle District.

Mack, Richard N., and John N. Thompson

1982 Evolution in Steppe With Few Large, Hooved Animals. *The American Naturalist* 119(6):757-771.

Madsen, Brigham D.

1958 *The Bannack of Idaho.* Caxton, Caldwell, Idaho.

Malouf, Carling I.

1957 *The Cultural Connections Between the Prehistoric Inhabitants of the Upper Missouri and Columbia River Systems.* Unpublished Ph.D. dissertation (not paginated). Manuscript in Special Collections in Montana State University Library.

1961 A Short History of Montana Archaeology. *Archaeology in Montana* 3:2.

1962 Pestles. *Archaeology in Montana* 4(4):3-7.

1963 Battle Pits and War Lodges. *Archaeology in Montana* 5(2):1-11.

1966 Slate Knives Or Scrapers. *Archaeology in Montana* 6(4):1-4.

1974 Economy and Land Use by the Indians of Western Montana, USA. In *Interior Salish and Eastern Washington Indians, II,* edited by S. A. Chalfant, C. Malouf, and M. G. Burlingame, pp. 117-178, Garland, N.Y.

1975 Missouri River Headwaters Archaeology. *Archaeology in Montana* 16:1-42.

1981 Salvage Archaeology and Its Application in Montana. *Anthropology Papers* No. 2. Department of Anthropology, University of Montana, Missoula.

1982 A Study of the Prehistoric and Historic Sites Along the Lower Clark Fork River, Western Montana. *University of Montana Contributions to Anthropology*, No. 7.

Martin, N., and D. Pyrah
1971 Sage Grouse. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 135-141. Montana Fish and Game Department, Helena.

May, Bruce, Bob Rainville, and Joe Huston
1979 *Trout Habitat Suitability Quantification Study*. Montana Department of Fish, Wildlife and Parks, Fisheries Division, Helena.

Mehringer, Peter J., Stephan F. Arno, and Kenneth L. Peterson
1977 Post-Glacial History of Lost Trail Pass Bog, Bitterroot Mountains, Montana. *Arctic and Alpine Research* 9(4):345-368.

Meltzer, D. J.
1979 Paradigms and the Nature of Change in American Archaeology. *American Antiquity* 44:644-657.

Miller, Carl F.
1963 Archaeological Manifestations in the Toole County Section of the Tiber Reservoir Basin, Montana. *Smithsonian Institution, Bureau of American Ethnology, Bulletin* 26(31):235-256.

Miller, Jay
1982 People, Berdaches and Left-Handed Bears: Human Variation in Native America. *Journal of Anthropological Research* 38(3):274-287.

Montana Magazine
1981 Montana Mountain Ranges. *Montana Geographic Series* No. 1. Montana Magazine, Helena.

Mooney, James
1892-1893 The Ghost-Dance Religion and the Sioux Outbreak of 1890. *Fourteenth Annual Report, Bureau of American Ethnology*, Part 2.

Mulloy, William T.
1943 A prehistoric campsite near Red Lodge, Montana. *American Anthropologist* Vol. 9, No. 2, pp. 170-179.

1958 A Preliminary Historical Outline for the Northwestern Plains. *University of Wyoming Publications in Science* 22(1).

Mueggler, W. F., and W. P. Hanal

1974 *Mountain Grassland and Shrubland Habitat Types of Western Montana.* USDA Forest Service, Region 1, Missoula.

Murphy, Kerry, and Bart O'Gara

1982 Montana's Mysterious Cat. *Montana Outdoors* 13(3):1-4.

Murray, Audrey L., J. D. Keyser, and F. W. Sharrock

1977 A Preliminary Shoreline Survey of Lima Reservoir: Archaeology in the Centennial Valley of Southwestern Montana. *Plains Anthropologist* 22(75):51-57.

Murphy, Robert F., and Yolanda Murphy

1960 Shoshone-Bannock Subsistence and Society. *Anthropological Records* 6:293-338.

Mussehl, T., P. Schladweiler, and R. Weckwerth

1971 Forest Grouse. In *Game Management in Montana* edited by T. W. Mussehl and F. W. Howell, pp. 143-151. Montana Fish and Game Department, Helena.

Napton, Lewis K.

1966 *Canyon and Valley: Preliminary Archaeological Survey in the Gallatin Area, Montana.* Unpublished M.A. thesis, University of Montana, Missoula.

Narrol, R.

1962 Floor Area and Settlement Population. *American Antiquity* 27:587-589.

Perry, Eugene S.

1962 Montana in the Geologic Past. *Montana Bureau of Mine and Geology Bulletin* 26. Butte.

Petrides, George A.

1956 Big Game Densities and Range Carrying Capacities in East Africa. *Transactions of the 21st North American Wildlife Conference*, pp. 525-537.

Powell, J. W.

1875 *Exploration of the Colorado River of the West and its Tributaries, Explored in 1869-1872, Under the Direction of the Secretary of the Smithsonian Institution.*

Ray, Verne F.

1933 The Sanpoil and Nespelem: Salishan Peoples of Northwestern Washington. *University of Washington, Publications in Anthropology* No. 5.

1939 *Cultural Relations on the Plateau of Northwestern America.* Publications of the F. W. Hodge Anniversary Publication Fund, Vol. 3. The Southwest Museum, Los Angeles.

1942 Cultural Element Distributions: XXII Plateau. *Anthropological Records* 8:2.

Reeves, Brian O. K.

1969 The Southern Alberta Paleo-Cultural/Paleo-Environmental Sequence. In *Post-Pleistocene Man and His Environments on the Northern Plains*, edited by R. G. Forbis et al., pp. 6-46. University of Calgary Archaeological Association.

1970 *Culture Change in the Northern Plains: 1000 B.C.-A.D. 1000.* Unpublished Ph.D. dissertation, Department of Archaeology, University of Calgary, Alberta.

Reher, Charles A.

1977 Adaptive Process on the Shortgrass Plains. In *For Theory Building in Archaeology*, edited by Lewis R. Binford, pp. 13-40. Academic Press, New York.

Richmond, Gerald M.
1965 Glaciation of the Rocky Mountains. In *The Quaternary of the United States*, edited by H. E. Wright and D. G Frey, pp. 217-230. Princeton University Press, Princeton, New Jersey.

Rideout, Chester B.
1978 Mountain Goat. In *Big Game of North America, Ecology and Management*, edited by John L. Schmidt and Douglas L. Gilbert, pp. 149-159. Stackpole Books, Harrisburg, Pennsylvania.

Roll, Tom E.
1978 Tiber Reservoir, Montana: 1974 Archaeological Survey. *Archaeology in Montana* 19(1&2):59-130.

Roll, Tom E. (editor)
1982 *Kootenai Canyon Archaeology the 1979 LAURD Project Final Mitigation Report*. Report by Montana State University to U.S. Army Corps of Engineers, Seattle District.

Roll, Tom E., and Ken Deaver
1980 The Bootlegger Trail Site, A Large Prehistoric Spring Bison Kill. *IAS Investigation Reports* 1. Washington, D.C.

Roll, Tom E., and Craig Henry
1982 Toward a Model of Prehistoric Subsistence in the Canyon Locality of the Kootenai River Region. In *Kootenai Canyon Archaeology: The 1979 LAURD Project Final Mitigation Report*, edited by Tom E. Roll, pp. 4.1-4.21. Report by Montana State University to the U.S. Army Corps of Engineers, Seattle District.

Roll, Tom E., and Marc B. Smith (editors)
1982 *Libby Additional Units and Reregulating Dam Cultural Resources Project 1979: Descriptive Archaeology*. Montana State University, Bozeman.

Ross, Clyde P., David A. Andrews, and Irving J. Witkind
1958 *Geologic Map of Montana*. U.S. Geological Survey, Washington, D.C.

Ross, Robert L., and Harold E. Hunter
1976 *Climax Vegetation of Montana Based on Soils and Climate*. Soil Conservation Service, Bozeman, Montana.

Schaeffer, Claude E.
1934-5(?) *An Acculturation Study of the Indians of the Flathead Reservation of Western Arizona* (sic). Ms. submitted to the Commissioner of Indian Affairs, Washington, D.C.

1934 *Fieldwork Among Flathead Indians, Montana*. Ms. on file at the Alberta-Glenbow Museum, Calgary, Alberta. I & II.

Schaeffer, Claude E.
1935 Fieldnotes. Vol. 2. (Title page also notes Anthropology Archives, W.P.A. Project, Henrietta Jones—1936). Ms. on file at the Alberta-Glenbow Museum, Calgary, Alberta.

1952 Molded Pottery Among the Kutenai Indians. *Anthropology and Sociology Papers* No. 6. Montana State University, Missoula.

Schroedl, Gerald F.
1973 The Archaeological Occurrence of Bison in the Southern Plateau. *Reports of Investigations* No. 51. Laboratory of Anthropology, Washington State University, Pullman.

Shumate, Maynard
1950 The Archaeology of the Vicinity of Great Falls, Montana. *Anthropology and Sociology Papers* No. 2. Montana State University, Missoula.

1958-59 Projectile Points From the Surface Near Great Falls. *Archaeology in Montana* 1(3):3-4.

1962 Some Surface Finds Near Great Falls, Montana. *Archaeology in Montana* 4(4):7-8.

1967 The Carter Ferry Buffalo Kill. *Archaeology in Montana* 8(2):1-10.

1972 Surface Collection From the Archie Johnson Site (24CA1004). *Archaeology in Montana* 13(1):39.

1974 Atlatl Weights From the Missouri Valley in West-Central Montana. *Archaeology in Montana* 15(3):55-58.

1975 Early Cultures at the Colemans Ridge Site Near Cascade, Montana. *Archaeology in Montana* 16(3):117-120.

1976 Two Former Besant Pounds Along the Sun River. *Archaeology in Montana* 17(1&2):11-31.

1982 The Archaeology of Post-Glacial Lake Great Falls. *Archaeology in Montana* 23(3):1-39.

Simon, Arleyn
1979 Pottery Manufacture Analysis: Experimental Assessment of Technological Continuity in the Altamont Region. *Archaeology in Montana* 20(2):1-78.

Smith, Marc B.
1981 Archaeological Investigations in the Deep Creek—French Creek Locality, Deer Lodge County, Montana. *Archaeology in Montana* 22(2):39-87.

Sonderegger, John L. James D. Schofield, Richard B. Berg, and Matthew L. Mannick
1982 The Upper Centennial Valley, Beaverhead and Madison Counties, Montana. *Montana Bureau of Mines and Geology Memoir* 50. Butte.

Spinden, Herbert Joseph
1908 The Nez Perce Indians. *Memoirs, American Anthropological Association* No. 2:165-274.

Steedman, Elsie Viault
1930 Ethnobotany of the Thompson Indians of British Columbia Based on Field Notes By James A. Teit. *Forty-fifth Annual Report, Bureau of American Ethnology*, pp. 441-522.

Stelfox, John C., and Richard D. Taber
1969 Big Game in the Northern Rocky Mountain Coniferous Forest. In *Coniferous Forests of the Northern Rocky Mountains*, edited by Richard D. Taber, pp. 197-222. Center for Natural Resources, University of Montana Foundation, Missoula.

Steward, Julian H.
1938 Basin-Plateau Aboriginal Sociopolitical Groups. *Bureau of American Ethnology Bulletin* 120.

Swanson, Earl H., Jr.
1966 Cultural Relations Between Two Plains. *Archaeology in Montana* 7(2):1-2.

1972 *Birch Creek: Human Ecology in the Cool Desert of the Northern Rocky Mountains 9,000 B.C. - A.D. 1850*. The Idaho State University Press, Pocatello.

Teit, James A.
1900 The Thompson Indians of British Columbia. *Memoirs of the American Museum of Natural History* 2(1):163-392.

1906 The Lillooet Indians. *Memoirs of the American Museum of Natural History* 4:193-300.

1927-28 The Salishan Tribes of the Western Plateaus. *Bureau of American Ethnography Annual Report* 45:23-396.

Thomas, David H.
1972 A Computer Simulation Model of Great Basin Shoshonean Subsistence and Settlement Patterns. In *Models in Archaeology*, edited by D.L. Clarke, pp. 671-704. London.

Thwaites, R. G. (editor)
1966a Part II of Maximilian, Prince of Wied's Travels in the Interior of North America, 1832-1834. In *Early Western Travels 1748-1846*, Vol. 23. AMS Press, Inc., New York.

1966b DeSmet's Oregon Missions and Travels over the Rocky Mountains 1845-1846. In *Early Western Travels 1748-1846*, Vol. 29. AMS Press, Inc., New York.

Turney-High, Harry H.
1937 The Flathead Indians of Montana. *American Anthropological Association Memoirs* 48:1-160.

1941 Ethnography of the Kutenai. *American Anthropological Association Memoirs* 56.

United States Department of Commerce (USDC)
1980 *Climatological Data Annual Summary*. National Climatic Center, Ashville, North Carolina.

Waddington, J. C. B., and H. E. Wright, Jr.
1974 Late Quaternary Vegetational Changes on the East Side of Yellowstone Park, Wyoming. *Quaternary Research* 4(2):175-184.

Walcheck, Ken
1976 Montana Wildlife 170 Years Ago. *Montana Outdoors* 7(4):15-30.

Weckwerth, R.
1971 Black Bear and Grizzly Bear. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 115-125. Montana Fish and Game Department, Helena.

Weisel, G. F.
1952 Animal Names, Anatomical Terms and Some Ethnozoology of the Flathead Indians. *Journal of the Washington Academy of Science* 42(11):345-355.

White, Thain
n.d.a Kutenai Pipes. *Western Anthropology* No. 1.

n.d.b Kutenai Place Names of the Flathead Lake Region In Northwestern Montana. *Flathead Lake Lookout Museum* No. 11. Lakeside, Montana.

1959 Tipi Rings in the Flathead Lake Area, Western Montana. *Anthropology and Sociology Papers* No. 19. Montana State University, Missoula.

Will, George F.
1946 Tree Ring Study in North Dakota. *North Dakota Agricultural College Bulletin* 388.

Willey, Gordon R.
1966 *Introduction to North American Archaeology. Vol. 1: North and Middle America*. Prentice-Hall, Englewood Cliffs, New Jersey.

Willey, Gordon R., and Philip Phillips
1958 *Method and Theory in American Archaeology*. The University of Chicago Press, Chicago.

Willey, Gordon R., and Jeremy A. Sabloff
1974 *A History of American Archaeology*. W. H. Freeman & Company, San Francisco.

Wilmsen, Edwin N.
1973 Interaction, Spacing Behavior and the Organization of Hunting Bands. *Journal of Anthropological Research* 29(1):1-31.

Wishart, William
1978 Bighorn Sheep. In *Big Game of North America, Ecology and Management*, edited by John L. Schmidt and Douglas L. Gilbert, pp. 161-171. Stackpole Books, Harrisburg, Pennsylvania.

Wissler, Clark
1910 Material Culture of the Blackfoot Indians. *American Museum of Natural History* 5:1.

1911 The Social Life of the Blackfoot Indians. *American Museum of Natural History* 7:1.

1912 The Ceremonial Bundles of the Blackfoot Indians. *American Museum of Natural History* 7:2.

Wissler, Clark, and D. C. Duvall
1908 Mythology of the Blackfoot Indians. *American Museum of Natural History* 2:1.

Wissner, Polly
1974 A Functional Estimator of Population From Floor Area. *American Antiquity* 39:343-349.

Witt, D., and J. Salinas
1971 Waterfowl. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 185-193. Montana Fish and Game Department, Helena.

Wright, Gary A., Susan Bender, and Stuart Reeve
1980 High Country Adaptations. *Plains Anthropologist* 25(89):181-197.

Zeier, Charles D.
1975 *A Morphology—Use Analysis of Besant Phase Projectile Points: Antonsen Site (24GA660) Gallatin County, Montana*. Unpublished M.A. thesis, University of Nebraska, Lincoln.

Appendix I: Sites in the Butte District

SITES IN BUTTE DISTRICT

Site #	St Typ	Land-Fm	Site Area Sq. M.	Elev	Lithic	Bone	FCR	Charcl	# Rings	# Cairn	# Align	# Pits	# Vsnqt	# Hrth	# Other
BE0029	LS	LW	250	6640	Y	N	N	N	0	0	0	0	0	0	0
BE0030	LS	LW	10000	6600	Y	Y	Y	N	0	0	0	0	0	0	0
BE0031	LS	BR	232	6650	Y	N	N	N	0	0	0	0	0	0	0
BE0033	QO	LW	2590080	6700	Y	N	N	N	0	0	0	0	0	0	0
BE0034	LS	LW	2500	6577	Y	Y	N	N	0	0	0	0	0	0	0
BE0035	LS	BR	10000	6700	Y	N	N	N	0	0	0	0	0	0	0
BE0036	CN	BR	10000	7000	Y	N	N	N	0	3	0	0	0	2	0
BE0039	LS	LW	22500	6600	Y	N	N	N	0	0	0	0	0	0	0
BE0040	LS	BR	323760	6600	Y	N	Y	N	0	0	0	0	0	0	0
BE0041	LS	LW	5500	6577	Y	N	N	N	0	0	0	0	0	0	0
BE0042	LS	BR	100	6600	Y	N	N	N	0	0	0	0	0	0	0
BE0043	LS	BR	10000	6600	Y	N	N	N	0	0	0	0	0	0	0
E0044	LS	BR	160000	6577	Y	N	Y	N	0	0	0	0	0	1	0
BE0046	LS	BR	2500	0	Y	N	N	N	0	0	0	0	0	0	0
BE0047	LS	LW	300	6580	Y	Y	Y	N	0	0	0	0	0	1	0
BE0048	LS	LW	10000	6600	Y	N	N	N	0	0	0	0	0	0	0
BE0050	LS	UC	1250	6580	Y	N	N	N	0	0	0	0	0	0	0
BE0051	LS	LW	41800	6640	Y	N	N	N	0	0	0	0	0	0	0
BE0052	LS	BR	2000	6600	Y	N	Y	N	0	0	0	0	0	0	0
BE0054	LS	UN	750	6600	Y	N	N	N	0	0	0	0	0	0	0
BE0056	LS	LW	15000	6590	Y	Y	N	N	0	0	0	0	0	0	0
BE0059	LS	LW	1000	6580	Y	N	N	N	0	0	0	0	0	0	0
BE0061	QO	HG	480000	7400	Y	N	N	N	0	0	0	0	0	0	0
BE0063	LS	HG	60000	6960	Y	N	N	N	0	0	0	0	0	0	0
BE0064	LS	HG	20000	8269	Y	N	N	N	0	0	0	0	0	0	0
BE0065	LS	LW	500	6577	Y	N	N	N	0	0	0	0	0	0	0
BE0066	LS	LW	50	6600	Y	N	N	N	0	0	0	0	0	0	0
BE0071	RN	UC	40000	7080	N	N	N	N	31	1	0	0	0	0	0
BE0166	TR	UC	1295040	6240	N	N	N	N	0	0	0	0	0	0	0
BE0180	LS	UC	10000	6700	Y	N	N	N	0	0	0	0	0	0	0
BE0181	LS	LW	250000	6700	Y	N	N	N	0	0	0	0	0	0	0
BE0189	BK	BR	160000	6700	Y	Y	N	N	0	0	2	4	0	0	0
BE0190	RN	UC	20000	6720	N	N	N	N	22	1	1	0	0	0	0
BE0192	PT	HG	5000	8570	N	N	N	N	0	0	0	14	0	0	2
BE0194	LS	UC	10000	6150	Y	N	N	N	0	0	0	0	0	0	0
BE0195	LS	UC	10000	6400	Y	N	N	N	0	0	0	0	0	0	0
BE0207	LS	HG	20235	7050	Y	N	N	N	0	0	0	0	0	0	0
BE0208	CN	HG	4	0	N	N	N	N	0	1	0	0	0	0	0
BE0209	CN	HG	10000	7150	N	N	N	N	0	8	0	0	0	0	0
BE0210	LS	UC	1000	6850	Y	N	N	N	0	0	0	0	0	0	0
BE0211	LS	UC	20000	6800	Y	N	N	N	0	0	0	0	0	0	0
BE0212	LS	HG	1000	6920	Y	Y	N	N	0	0	0	0	0	0	0
BE0215	QU	UC	1000	7100	Y	N	N	N	0	0	0	0	0	0	0
BE0217	QU	HG	101175	7450	Y	N	N	N	0	0	0	0	0	0	0
BE0218	LS	LW	404700	6770	Y	N	N	N	0	0	0	0	0	0	0
BE0219	LS	UC	8094	7450	Y	Y	N	N	0	0	0	0	0	0	0
BE0220	CR	HG	25	7680	N	N	N	N	0	0	0	0	1	0	0
BE0221	LS	UP	16188	4980	Y	N	Y	N	0	0	0	0	0	0	0
BE0227	LS	UP	2023	5400	Y	N	N	N	0	0	0	0	0	0	0
BE0231	LS	HG	8094	5060	Y	N	N	N	1	0	0	0	0	0	0

SITE TYPES: AL=ALIGNMENT, BK=BISON KILL, CN=CAIRN, CR=CEREMONIAL, HE=HEARTH, LS=LITHIC SCATTER, PC=ROCK ART, PT=PITS OR BLINDS, Q__=QUARRY(__=MATERIAL TYPE), RN=RING, RS=ROCKSHELTER, TR=TRAIL, UN=UNKNOWN, WK=WICKIUP.

LANDFORMS: BR=BREAKS, HG=HIGHLANDS, LW=LOWLANDS, UC=CREEKSIDE, UN=UNKNOWN, UP=UPLANDS.

MATERIAL TYPE: O=OBSIDIAN/IGNUMBRITE, C=CHERT/CHALCEDONY, B=BASALT, U=UNKNOWN.

SITES IN BUTTE DISTRICT

Site #	St Typ	Land-Fm	Site Area Sq. M.	Elev	Lithic	Bone	FCR	Charcl	# Rings	# Cairn	# Align	# Pits	# Vsnqt	# Hrth	# Other
BE0232	LS	LW	80	0	Y	N	N	N	0	0	0	0	0	0	0
BE0233	LS	LW	80	6230	Y	N	N	N	0	0	0	0	0	0	0
BE0256	LS	UC	60000	6280	Y	N	N	N	0	0	0	0	0	0	0
BE0257	QU	HG	160000	6340	Y	N	N	N	0	0	0	0	0	0	0
BE0264	LS	HG	45000	6460	Y	Y	N	N	0	0	0	0	0	1	0
BE0278	QU	HG	2500	0	Y	N	N	N	0	0	0	0	0	0	0
BE0281	LS	HG	8094	8000	Y	N	N	N	0	0	0	0	0	0	0
BE0282	LS	HG	2023	8400	Y	N	N	N	0	0	0	0	0	0	0
BE0283	LS	HG	4047	8120	Y	N	N	N	0	0	0	0	0	0	0
BE0284	LS	HG	40470	8100	Y	N	N	N	0	0	0	0	0	0	0
BE0285	LS	HG	4047	8080	Y	N	N	N	0	0	0	0	0	0	0
BE0286	LS	HG	20235	8195	Y	N	N	N	0	0	0	0	0	0	0
BE0287	LS	UC	2023	7540	Y	N	N	N	0	0	0	0	0	0	0
BE0288	LS	HG	8094	7200	Y	N	N	N	0	0	0	0	0	0	0
BE0289	CR	HG	4	9889	N	N	N	N	0	0	0	0	1	0	0
BE0290	LS	HG	20235	8049	Y	N	N	N	0	0	0	0	0	0	0
BE0291	LS	HG	20235	7820	Y	N	N	N	0	0	0	0	0	0	0
BE0292	LS	HG	20235	8080	Y	N	N	N	0	0	0	0	0	0	0
BE0293	LS	HG	8094	8160	Y	N	N	N	0	0	0	0	0	0	0
BE0295	LS	LW	12141	0	Y	N	N	N	0	0	0	0	0	0	0
BE0296	LS	UC	12141	7920	Y	N	N	N	0	0	0	0	0	0	0
BE0297	LS	HG	40470	9080	Y	N	N	N	0	0	0	0	0	0	0
BE0298	LS	LW	20235	0	Y	N	N	N	0	0	0	0	0	0	0
BE0300	LS	UC	8094	7210	Y	N	N	N	0	0	0	0	0	0	0
BE0401	RS	HG	6	7920	Y	N	N	N	0	0	0	0	0	0	0
BE0402	LS	HG	68799	6620	Y	N	N	N	0	0	0	0	0	0	0
BE0403	CN	HG	20235	6700	Y	N	N	N	0	2	0	0	0	0	0
BE0404	LS	HG	20235	6530	Y	N	N	N	0	0	0	0	0	0	0
BE0407	LS	HG	12141	5780	Y	N	N	N	0	3	0	0	0	0	0
BE0410	CN	HG	2	0	N	N	N	N	0	1	0	0	0	0	0
BE0411	UN	UC	1	5300	N	Y	N	N	0	0	0	0	0	0	0
BE0412	CN	HG	2023	9050	N	N	N	N	0	1	0	1	0	0	0
BE0413	LS	HG	25	7300	Y	N	N	N	0	0	0	0	0	0	0
BE0414	LS	UC	300	7880	Y	N	N	N	0	0	0	0	0	0	0
BE0415	LS	UC	1000	6320	Y	N	N	N	0	0	0	0	0	0	0
BE0417	QU	HG	4047	7100	Y	N	N	N	0	0	0	0	0	0	0
BE0418	LS	UC	800	7000	Y	N	N	N	0	0	0	0	0	0	0
BE0419	LS	LW	242820	6450	Y	Y	N	N	0	0	0	0	0	0	0
BE0420	CN	HG	20	8320	N	N	N	N	0	2	0	0	0	0	0
BE0421	QB	HG	40470	7440	Y	N	N	N	0	0	0	0	0	0	0
BE0422	LS	UC	8094	6920	Y	Y	N	N	0	0	0	0	0	0	0
BE0425	RN	HG	25	7170	N	N	N	N	1	0	0	0	0	0	0
BE0426	RN	HG	20235	6500	Y	N	N	N	1	0	0	0	0	0	0
BE0428	LS	HG	121410	7640	Y	N	N	N	0	0	0	0	0	0	0
BE0429	QO	HG	20235	8580	Y	N	N	N	0	0	0	0	0	0	0
BE0430	LS	HG	100	8840	Y	N	N	N	0	0	0	0	0	0	0
BE0431	LS	HG	1500	8960	Y	N	N	N	0	0	0	0	0	0	0
BE0432	QO	HG	1200	8960	Y	N	N	N	0	0	0	0	0	0	0
BE0433	LS	HG	4047	8990	Y	N	N	N	0	0	0	0	0	0	0
BE0434	CR	HG	3	8200	Y	N	N	N	0	0	0	0	1	0	0
BE0435	QO	HG	500	8960	Y	N	N	N	0	0	0	0	0	0	0
BE0436	LS	UC	450	7500	Y	N	N	N	0	0	0	0	0	0	0
BE0437	LS	UC	4500	7300	Y	N	N	N	0	0	0	0	0	0	0
BE0438	LS	UC	4047	7160	Y	N	N	N	0	0	0	0	0	0	0

SITE TYPES: AL=ALIGNMENT, BK=BISON KILL, CN=CAIRN, CR=CEREMONIAL, HE=HEARTH, LS=LITHIC SCATTER, PC=ROCK ART, PT=PITS OR BLINDS, Q__=QUARRY(__=MATERIAL TYPE), RN=RING, RS=ROCKSHELTER, TR=TRAIL, UN=UNKNOWN, WK=WICKIUP.

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SITES IN BUTTE DISTRICT

Site #	St Typ	Land-Fm	Site Area Sq. M.	Elev	Lithic	Bone	FCR	Charcl	# Rings	# Cairn	# Align	# Pits	# Vsnqt	# Hrth	# Other
BE0440	LS	UC	4047	6900	Y	N	N	N	0	0	0	0	0	0	0
BE0442	LS	UC	4047	8100	Y	N	N	N	0	0	0	0	0	0	0
BE0443	QO	HG	1200	8000	Y	N	N	N	0	0	0	0	0	0	0
BE0444	LS	HG	4047	7840	Y	N	N	N	0	0	0	0	0	0	0
BE0445	LS	HG	4047	7480	Y	N	N	N	0	0	0	0	0	0	0
BE0446	WK	HG	25	7600	N	N	N	N	0	0	0	0	0	0	1
BE0447	CN	HG	4047	7500	N	N	N	N	0	1	1	0	0	0	0
BE0448	RN	HG	4047	7750	N	N	N	N	1	2	0	0	0	0	0
BE0449	LS	LW	2000	6600	Y	N	N	N	0	0	0	0	0	0	0
BE0450	LS	LW	200	6600	Y	N	N	N	0	0	0	0	0	0	0
BE0453	LS	LW	272	6640	Y	N	N	N	0	0	0	0	0	0	0
BE0454	LS	HG	8094	7800	Y	N	N	N	0	0	0	0	0	0	0
BE0455	LS	UC	242820	7135	Y	N	N	N	0	0	0	0	0	0	0
BE0456	CN	UN	20	6461	Y	N	N	N	0	3	0	0	0	0	0
BE0457	BK	UN	323760	6300	Y	Y	N	N	0	1	5	0	0	0	0
BE0458	AL	UN	1	7000	Y	N	N	N	0	38	1	0	0	0	0
BE0459	LS	UN	4	6624	Y	N	N	N	0	0	0	0	0	0	0
BE0460	LS	UC	41800	6084	Y	N	N	N	0	0	0	0	0	0	0
BE0462	LS	HG	4047	5488	Y	N	N	N	0	0	0	0	0	0	0
BE0463	LS	HG	6070	5400	Y	N	N	N	0	0	0	0	0	0	0
BE0464	LS	UN	4047	5100	Y	N	N	N	0	0	0	0	0	0	0
BE0465	AL	UN	6070	5180	Y	N	N	N	0	0	1	0	0	0	0
BE0466	RN	LW	202350	0	N	N	N	N	0	0	0	0	0	0	0
BE0467	LS	UP	12141	6525	Y	N	N	N	0	0	0	0	0	0	0
BE0468	LS	UP	8094	6726	Y	N	N	N	0	0	0	0	0	0	0
BE0469	QB	UP	12141	5600	Y	N	N	N	0	0	0	0	0	0	0
BE0470	QC	HG	4047	7600	Y	N	N	N	0	0	0	0	0	0	0
BE0486	LS	LW	4047	5300	Y	N	N	N	0	0	0	0	0	0	0
BE0501	LS	HG	41800	5700	Y	N	Y	N	0	0	0	0	0	0	0
BE0502	LS	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0503	LS	UP	6000	6420	Y	N	N	N	0	0	0	0	0	0	0
BE0504	LS	LW	5500	6600	Y	Y	Y	N	0	0	0	0	0	0	0
BE0506	LS	HG	225	7200	Y	N	N	N	0	0	0	0	0	0	0
BE0507	LS	UC	30	7200	Y	N	N	N	0	0	0	0	0	0	0
BE0559	QU	UP	60705	6800	Y	N	N	N	0	0	0	80	0	0	0
BE0601	WK	HG	1011	7250	Y	Y	N	N	0	0	0	0	0	0	1
BE0637	LS	UP	25	7200	Y	Y	N	N	0	0	0	0	0	0	0
BE0653	LS	LW	161880	0	Y	N	N	N	0	0	0	0	0	0	0
BE0654	CN	UC	4047	6020	N	N	N	N	0	2	0	0	0	0	0
BE0655	TR	HG	4047	0	N	N	N	N	0	0	0	0	0	0	0
BE0659	CN	HG	4	7350	N	N	N	N	0	1	0	0	0	0	0
BE0660	RN	HG	20235	7290	Y	N	N	N	10	5	0	0	0	0	0
BE0661	QU	UC	161880	6780	Y	N	N	N	0	0	0	0	0	0	0
BE0665	RN	UC	196	7076	N	N	N	N	1	0	0	0	0	0	0
BE0666	RN	UC	18	7040	N	N	N	N	1	1	0	0	0	0	0
BE0667	RN	UC	4000	6820	N	N	N	N	1	0	0	0	0	0	0
BE0668	RN	UC	41800	7330	N	N	N	N	1	0	0	0	0	0	0
BE0669	RN	UC	41800	7420	N	N	N	N	1	0	0	0	0	0	0
BE0670	LS	HG	4047	7400	Y	N	N	N	0	2	0	0	0	0	0
BE0671	LS	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0674	UN	UC	41800	7120	Y	N	N	N	0	0	0	0	0	0	0
BE0675	LS	UC	20235	6800	Y	N	N	N	0	0	0	0	0	0	0
BE0676	LS	UC	4047	7000	Y	N	N	N	0	0	0	0	0	0	0
BE0677	LS	HG	4047	7125	Y	N	N	N	0	0	0	0	0	0	0

SITE TYPES: AL=ALIGNMENT, BK=BISON KILL, CN=CAIRN, CR=CEREMONIAL, HE=HEARTH, LS=LITHIC SCATTER, PC=ROCK ART, PT=PITS OR BLINDS, Q__=QUARRY(__=MATERIAL TYPE), RN=RING, RS=ROCKSHELTER, TR=TRAIL, UN=UNKNOWN, WK=WICKIUP.

LANDFORMS: BR=BREAKS, HG=HIGHLANDS, LW=LOWLANDS, UC=CREEKSIDE, UN=UNKNOWN, UP=UPLANDS.

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SITES IN BUTTE DISTRICT

Site #	St Typ	Land-Fm	Site Area Sq. M.	Elev	Lithic	Bone	FCR	Charcl	# Rings	# Cairn	# Align	# Pits	# Vsnqt	# Hrth	# Other
BE0678	CN	HG	20235	6830	N	N	N	N	0	1	0	0	0	0	0
BE0679	UN	HG	4047	6940	Y	N	N	N	0	0	0	0	0	0	0
BE0680	LS	UC	8094	6500	Y	N	N	N	0	0	0	0	0	0	0
BE0681	QU	HG	40470	6300	Y	N	N	N	0	0	0	0	0	0	0
BE0682	QU	HG	647520	6100	Y	N	N	N	0	0	0	0	0	0	0
BE0684	LS	UP	5	5000	Y	N	N	N	0	0	0	0	0	1	0
BE0685	LS	UC	12141	4870	Y	N	N	N	0	0	0	0	0	0	0
BE0686	LS	UC	12141	4900	Y	N	N	N	0	0	0	0	0	0	0
BE0688	LS	UC	4047	4990	Y	N	N	N	0	0	0	0	0	0	0
BE0465	AL	UN	6070	5180	Y	N	N	N	0	0	1	0	0	0	0
BE0689	LS	LW	80940	5747	Y	N	N	N	0	0	0	0	0	0	0
BE0690	RN	LW	41800	5760	N	N	N	N	1	0	0	0	0	0	0
BE0691	LS	LW	80940	5900	Y	N	N	N	0	0	0	0	0	0	0
BE0692	LS	LW	40470	5823	Y	Y	N	N	0	0	0	0	0	0	0
BE0693	RN	UC	4047	6100	Y	N	N	N	2	0	0	0	0	0	0
BE0694	PT	UC	60	6052	N	N	N	N	0	0	0	7	0	0	0
BE0695	LS	LW	4047	6000	Y	N	N	N	0	0	0	0	0	0	0
BE0696	LS	UC	41800	6720	Y	N	N	N	0	0	0	0	0	0	0
BE0697	LS	HG	20235	6920	Y	N	N	N	0	0	0	0	0	0	0
BE0699	LS	HG	4047	6820	Y	N	N	N	0	0	0	0	0	0	0
BE0700	LS	HG	8094	6700	Y	N	N	N	0	0	0	0	0	0	0
BE0701	LS	HG	3120	6307	Y	N	N	N	0	0	0	0	0	0	0
BE0702	LS	HG	24	6200	Y	N	N	N	0	0	0	0	0	0	0
BE0703	LS	UC	4047	6269	Y	N	N	N	0	0	0	0	0	0	0
BE0704	LS	HG	14764	6469	Y	N	N	N	0	0	0	0	0	0	0
BE0705	LS	UC	12141	6400	Y	N	N	N	0	0	0	0	0	0	0
BE0706	LS	HG	4047	6500	Y	N	N	N	0	0	0	0	0	0	0
BE0707	LS	UC	120	6400	Y	N	N	N	0	0	0	0	0	0	0
BE0708	LS	UC	8094	6600	Y	N	N	N	0	0	0	0	0	0	0
BE0709	LS	HG	50	6948	Y	N	N	N	0	0	0	0	0	0	0
BE0710	LS	HG	4047	6788	Y	N	N	N	0	0	0	0	0	0	0
BE0711	LS	UC	50	6407	Y	N	N	N	0	0	0	0	0	0	0
BE0712	LS	UC	16188	5922	Y	N	N	N	0	0	0	0	0	0	0
BE0713	LS	UC	4047	5976	Y	N	N	N	0	0	0	0	0	0	0
BE0714	LS	UC	4047	6134	Y	N	N	N	0	0	0	0	0	0	0
BE0715	LS	UC	4047	6134	Y	N	N	N	0	0	0	0	0	0	0
BE0716	LS	UC	4047	6100	Y	N	N	N	0	0	0	0	0	0	0
BE0717	LS	UC	8094	6000	Y	N	N	N	0	0	0	0	0	0	0
BE0718	LS	HG	161880	6892	Y	N	N	N	0	0	0	0	0	0	0
BE0720	UN	HG	4047	6360	Y	N	N	N	0	0	0	0	0	0	0
BE0721	LS	UC	70	6397	Y	N	N	N	0	0	0	0	0	0	0
BE0722	LS	UC	20235	6800	Y	N	N	N	0	0	0	0	0	0	0
BE0723	LS	UC	100	6234	Y	N	N	N	0	0	0	0	0	0	0
BE0724	LS	UC	80	6340	Y	N	N	N	0	0	0	0	0	0	0
BE0725	LS	UC	900	6348	Y	N	N	N	0	0	0	0	0	0	0
BE0726	LS	UC	1600	6348	Y	N	N	N	0	0	0	0	0	0	0
BE0727	QU	UC	20235	6681	Y	Y	N	N	0	0	0	1	0	0	0
BE0728	CN	HG	4	7200	N	N	N	N	0	1	0	0	0	0	0
BE0730	LS	UC	10000	6480	Y	N	N	N	0	0	0	0	0	0	0
BE0731	LS	UC	6000	6887	Y	Y	N	N	0	0	0	0	0	0	0
BE0732	LS	UC	20235	6040	Y	N	N	N	0	1	0	0	0	0	0
BE0733	CN	UC	4047	6320	N	N	N	N	0	1	0	0	0	0	0
BE0734	LS	UC	41800	6160	Y	N	N	N	0	0	0	0	0	0	0
BE0735	CR	UC	4047	6621	Y	N	N	N	0	0	0	0	1	0	0

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SITES IN BUTTE DISTRICT

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BE0736	LS	UC	4047	6370	Y	N	N	N	0	0	0	0	0	0	0
BE0737	UN	UC	41800	6320	Y	N	N	N	0	0	0	0	0	0	0
BE0738	LS	UC	8094	6370	Y	N	N	N	0	0	0	0	0	0	0
BE0739	LS	UP	202350	6131	Y	N	N	N	0	0	0	0	0	0	0
BE0740	LS	UC	100	6400	Y	N	N	N	0	0	0	0	0	0	0
BE0741	LS	UC	4047	6045	Y	N	N	N	0	0	0	0	0	0	0
BE0742	QU	UC	1942560	6072	Y	N	N	N	0	0	0	0	0	0	0
BE0743	CN	UC	647520	6920	N	N	N	N	0	5	0	0	0	0	0
BE0744	CN	UC	40470	7260	N	N	N	N	0	5	0	0	0	0	0
BE0745	CR	HG	2	7476	N	N	N	N	0	0	0	0	1	0	0
BE0746	CN	HG	20235	7563	N	N	N	N	0	5	0	0	0	0	0
BE0747	LS	UC	4047	6940	Y	N	N	N	0	1	0	0	0	0	0
BE0748	CN	UC	4047	6890	N	N	N	N	0	5	0	0	0	0	0
BE0750	LS	UC	100	6520	Y	N	N	N	0	0	0	0	0	0	0
BE0751	LS	UC	4047	6420	Y	N	N	N	0	0	0	0	0	0	0
BE0752	UN	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0753	CN	UC	400	6400	N	N	N	N	0	4	0	0	0	0	0
BE0754	LS	UC	4047	5840	Y	N	N	N	0	0	0	0	0	0	0
BE0755	LS	LW	50	5700	Y	N	N	N	0	0	0	0	0	0	0
BE0756	LS	LW	133	5585	Y	N	N	N	0	0	0	0	0	0	0
BE0757	QU	HG	40470	6718	Y	N	N	N	0	0	0	0	0	0	0
BE0758	LS	HG	8094	6718	Y	N	N	N	0	0	0	0	0	0	0
BE0759	LS	UC	20235	6480	Y	N	N	N	0	0	0	0	0	0	0
BE0760	RN	UC	100	5700	Y	N	N	N	3	0	0	0	0	0	0
BE0761	CN	UC	1	6200	Y	N	N	N	0	1	0	0	0	0	0
BE0762	LS	UC	4047	6440	Y	N	N	N	0	0	0	0	0	0	0
BE0763	LS	UC	8094	6380	Y	N	N	N	0	0	0	0	0	0	0
BE0764	LS	UC	40470	6190	Y	N	N	N	0	0	0	0	0	0	0
BE0767	UN	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0768	LS	HG	12141	6940	Y	N	N	N	0	0	0	0	0	0	0
BE0769	LS	UC	121410	7150	Y	N	N	N	0	0	0	0	0	0	0
BE0771	LS	UC	20235	6480	Y	N	N	N	0	0	0	0	0	0	0
BE0773	UN	HG	4047	0	Y	N	N	N	0	0	0	0	0	0	0
BE0774	LS	UC	40470	6890	Y	N	Y	N	0	0	0	0	0	1	0
BE0775	LS	UC	20235	7320	Y	N	N	N	0	0	0	0	0	0	0
BE0776	LS	HG	16188	6920	Y	N	N	N	0	0	0	0	0	0	0
BE0777	UN	UC	41800	6240	Y	N	N	N	0	0	0	0	0	0	0
BE0780	RN	UC	9	5760	Y	N	N	N	7	0	0	0	0	0	0
BE0781	LS	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0782	RN	HG	9	8315	Y	N	N	N	1	0	0	0	0	0	0
BE0783	LS	HG	20235	8000	Y	N	N	N	0	0	0	0	0	0	0
BE0784	LS	HG	8094	8000	Y	N	N	N	0	0	0	0	0	0	0
BE0785	RN	BR	4047	6625	Y	N	Y	N	1	0	0	0	0	0	0
BE0786	LS	LW	45	6640	Y	N	N	N	0	0	0	0	0	0	0
BE0820	RN	UC	8094	6610	Y	N	N	N	1	0	0	0	0	0	0
BE0822	LS	HG	3	6640	Y	N	N	N	0	0	0	0	0	0	0
BE0823	LS	HG	6	6640	Y	N	N	N	0	0	0	0	0	0	0
BE0824	QU	HG	20235	6500	Y	N	N	N	0	0	0	0	0	0	0
BE0825	LS	UC	40470	6393	Y	N	N	N	0	0	0	0	0	0	0
BE0826	QU	UC	8094	6260	N	N	N	N	0	0	0	0	0	0	0
BE0827	LS	UC	485640	6395	Y	N	Y	N	0	0	0	0	0	0	0
BE0828	LS	UC	12141	6080	Y	N	N	N	0	0	0	0	0	0	0
BE0830	UN	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0831	RN	UN	41800	0	N	N	N	N	1	1	0	0	0	0	0

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BE0833	LS	HG	12141	6600	Y	N	N	N	0	0	0	0	0	0	0
BE0834	LS	HG	4047	6550	Y	N	N	N	0	0	0	0	0	0	0
BE0835	RN	HG	8094	0	N	N	N	N	1	0	0	0	0	0	0
BE0837	AL	LW	7500	5200	N	N	N	N	0	0	1	0	0	0	0
BE0839	LS	UC	4047	7400	Y	N	N	N	0	0	0	0	0	0	0
BE0840	LS	UC	4047	5700	Y	N	N	N	0	0	0	0	0	0	0
BE0841	LS	UC	12141	5740	Y	N	N	N	0	0	0	0	0	0	0
BE0844	LS	HG	12141	6741	Y	N	N	N	0	0	0	0	0	0	0
BE0846	LS	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0847	LS	LW	41800	6631	Y	N	N	N	0	0	0	0	0	0	0
BE0848	CN	HG	4047	0	N	N	N	N	0	1	0	0	0	0	0
BE0850	LS	UC	20235	5650	Y	N	N	N	0	0	0	0	0	0	0
BE0851	CN	HG	4047	0	N	N	N	N	0	1	0	0	0	0	0
BE0853	QU	HG	161880	6276	Y	N	N	N	0	3	0	0	0	0	0
BE0854	AL	HG	2590080	6000	Y	N	N	N	0	0	6	0	0	0	0
BE0855	AL	HG	1942560	5653	N	N	N	N	0	0	1	0	0	0	0
BE0859	LS	HG	4047	8640	Y	N	N	N	0	0	0	0	0	0	0
BE0860	LS	HG	4047	0	Y	N	N	N	0	0	0	0	0	0	0
BE0861	LS	HG	4047	8640	Y	N	N	N	0	0	0	0	0	0	0
BE0862	LS	HG	4047	8700	Y	N	N	N	0	0	0	0	0	0	0
BE0863	LS	HG	4047	8950	Y	N	N	N	0	0	0	0	0	0	0
BE0864	LS	HG	8094	8950	Y	N	N	N	0	0	0	0	0	0	0
BE0865	CR	HG	28	9000	N	N	N	N	0	0	0	0	1	0	0
BE0866	RN	HG	12141	9000	Y	N	N	N	4	0	0	0	0	0	0
BE0867	LS	HG	12141	7960	Y	N	N	N	0	0	0	0	0	0	0
BE0868	LS	HG	4047	7850	Y	N	N	N	0	0	0	0	0	0	0
BE0869	LS	HG	4047	7950	Y	N	N	N	0	0	0	0	0	0	0
BE0875	LS	UC	4047	7970	Y	N	N	N	0	0	0	0	0	0	0
BE0876	LS	UC	4047	8010	Y	N	N	N	0	0	0	0	0	0	0
BE0877	LS	HG	20235	8040	Y	N	N	N	0	0	0	0	0	0	0
BE0878	LS	UC	800	6700	Y	N	N	N	0	0	0	0	0	0	0
BE0879	LS	UC	2400	6400	Y	N	Y	N	0	0	0	0	0	0	0
BE0880	LS	UC	10000	6700	Y	N	Y	N	0	0	0	0	0	0	0
BE0881	LS	LW	600	5860	Y	N	Y	N	0	0	0	0	0	0	0
BE0882	LS	UC	1200	7200	Y	N	N	N	0	0	0	0	0	0	0
BE0883	TR	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0885	PT	UC	60	6500	N	N	N	N	0	0	0	2	0	0	0
BE0887	LS	LW	1798	660	Y	N	N	N	0	0	0	0	0	0	0
BE0888	LS	UP	7000	6600	Y	N	Y	N	0	0	0	0	0	0	0
BE0889	LS	UC	2450	6600	Y	N	N	N	0	0	0	0	0	0	0
BE0892	LS	UC	40000	7480	Y	N	N	N	0	0	0	0	0	0	0
BE0894	LS	LW	70	0	Y	N	N	N	0	0	0	0	0	0	0
BE0895	PT	UC	4	6800	Y	N	Y	Y	0	0	0	1	0	0	0
BE0896	LS	UC	2500	6750	Y	N	N	N	0	0	0	0	0	0	0
BE0902	LS	UC	8000	6440	Y	Y	Y	N	0	0	0	0	0	0	0
BE0905	LS	UC	7000	6720	Y	Y	N	Y	0	0	0	0	0	0	0
BE0906	LS	LW	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0908	LS	HG	4047	0	Y	N	N	N	0	0	0	0	0	0	0
BE0909	LS	HG	4047	0	Y	N	N	N	0	0	0	0	0	0	0
BE0910	LS	LW	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0914	LS	HG	8094	0	Y	N	N	N	0	0	0	0	0	0	0
BE0915	LS	HG	20235	0	Y	N	N	N	0	0	0	0	0	0	0
BE0916	LS	HG	20235	0	Y	N	N	N	0	1	0	0	0	0	0
BE0919	LS	HG	12141	0	Y	N	N	N	0	0	0	0	0	0	0

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BE0920	LS	HG	80940	0	Y	N	N	N	0	0	0	0	0	0	0
BE0921	LS	UC	40470	0	Y	N	N	N	0	0	0	0	0	0	0
BE0923	RN	LW	20235	0	N	N	N	N	1	0	0	0	0	0	0
BE0930	LS	LW	63	6140	Y	Y	Y	N	0	0	0	0	0	0	0
BE0931	LS	UC	12	5240	Y	N	N	N	0	0	0	0	0	0	0
BE0932	RN	UP	450	5360	Y	N	N	N	2	0	0	0	0	0	0
BE0935	LS	HG	750	5300	Y	N	N	N	0	0	0	0	0	1	0
BE0936	LS	LW	1500	5680	Y	N	N	N	0	0	0	0	0	1	0
BE0937	LS	UP	2100	5720	Y	N	N	N	0	0	0	0	0	0	0
BE0952	LS	HG	1500	7020	Y	N	N	N	0	0	0	0	0	0	0
BE0953	LS	HG	5000	7260	Y	N	N	N	0	0	0	0	0	0	0
BE0954	LS	UC	8000	6730	Y	N	N	N	0	0	0	0	0	0	0
BE0955	LS	UC	17000	6720	Y	N	N	N	0	0	0	0	0	0	0
BE0956	LS	UC	3000	6720	Y	N	N	N	0	0	0	0	0	0	0
BE0957	QU	UP	148750	6720	Y	N	N	N	0	0	0	0	0	0	0
BE0958	LS	UC	154	6740	Y	N	N	N	0	0	0	0	0	0	0
BE0959	CN	HG	25	7400	Y	N	N	N	0	1	0	0	0	0	0
BE0960	CN	HG	50	7280	Y	N	N	N	0	4	0	0	0	0	0
BE0961	HE	LW	4	6340	N	N	Y	N	0	0	0	0	0	1	0
BE0962	LS	UC	1000	6000	Y	N	N	N	0	0	0	0	0	0	0
BE0963	LS	HG	100	7200	Y	N	N	N	0	1	0	0	0	0	0
BE0965	LS	UC	20000	6000	Y	N	N	N	0	0	0	0	0	0	0
BE0966	CN	UC	100	6800	Y	N	N	N	0	2	0	0	0	0	0
BE0968	LS	UC	10000	7060	Y	N	N	N	0	0	0	0	0	0	0
BE0969	LS	LW	300	5800	Y	N	N	N	0	0	0	0	0	0	0
BE0970	LS	HG	800	6140	Y	N	N	N	0	0	0	0	0	0	0
BE0971	LS	HG	200	6470	Y	N	N	N	0	0	0	0	0	0	0
BE0972	LS	HG	50	6440	Y	N	N	N	0	0	0	0	0	0	0
BE0973	LS	HG	500	6240	Y	N	N	N	0	1	0	0	0	0	0
BE0974	LS	LW	1000	5960	Y	N	N	N	0	0	0	0	0	1	0
BE0975	CN	HG	8	5880	Y	N	N	N	0	1	0	0	0	0	0
BE0976	LS	HG	8000	6400	Y	N	N	N	0	0	0	0	0	0	0
BE0977	LS	HG	25	6642	Y	N	Y	N	0	0	0	0	0	2	0
BE0981	LS	HG	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BE0982	LS	HG	4047	0	Y	N	N	N	0	1	0	0	0	0	0
BE0983	LS	UC	12141	0	Y	N	N	N	0	0	0	0	0	0	0
BE0990	LS	UC	15000	5360	Y	N	Y	N	0	0	0	0	0	0	0
BE0991	LS	UP	400	5620	Y	N	N	N	0	0	0	0	0	0	0
BE0992	LS	UP	13500	5640	Y	N	N	N	0	0	0	0	0	0	0
BE0994	LS	UC	6000	6320	Y	N	Y	N	0	0	0	0	0	0	0
BE0995	LS	HG	100	6400	Y	N	Y	N	0	0	0	0	0	0	0
BE1001	LS	UC	150	0	Y	N	N	N	0	0	0	0	0	0	0
BE1024	LS	LW	100	6560	Y	N	N	N	0	0	0	0	0	0	0
BE1025	LS	LW	100	0	Y	Y	Y	Y	0	0	0	0	0	2	0
BE1026	LS	CN	80940	7020	Y	N	N	N	0	0	0	0	0	0	0
BE1028	AL	UP	8094	5640	N	N	N	N	0	0	1	0	0	0	0
BE1033	UN	UN	41800	0	N	N	N	N	0	0	0	0	0	0	0
BE1065	LS	UC	7500	0	Y	N	N	N	0	0	0	0	0	0	0
BE1067	LS	LW	5000	6000	Y	N	N	N	0	0	0	0	0	0	0
BE9901	LS	UC	100	6720	Y	N	N	N	0	0	0	0	0	0	0
BE9902	LS	UC	2100	6080	Y	N	N	N	0	0	0	0	0	0	0
BE9903	LS	HG	200	6360	Y	N	N	N	0	0	0	0	0	0	0
BE9904	LS	HG	150	6720	Y	N	N	N	0	0	0	0	0	0	0
BE9905	LS	HG	8000	6880	Y	N	N	N	0	0	0	0	0	0	0

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BE9906	LS	HG	2500	6720	Y	N	N	N	0	0	0	0	0	0	0
BE9907	LS	HG	100	6800	Y	N	N	N	0	0	0	0	0	0	0
BE9908	LS	HG	4000	6860	Y	N	N	N	0	0	0	0	0	0	0
BE9909	LS	UC	11500	7000	Y	Y	Y	N	0	0	0	0	0	1	0
BE9910	LS	UC	2400	6080	Y	N	N	N	0	0	0	0	0	0	0
BE9911	LS	UC	104	6660	Y	N	N	N	0	0	0	0	0	0	0
BE9912	LS	UC	10625	6700	Y	Y	Y	N	0	0	0	0	0	0	0
BE9913	LS	UC	5950	5500	Y	N	Y	N	0	0	0	0	0	2	0
BW0061	RN	LW	40470	4800	Y	N	N	N	10	0	0	0	0	0	0
BW0063	LS	UC	250000	4800	Y	N	N	N	0	0	0	0	0	0	0
BW0070	LS	UC	121410	4460	Y	N	N	N	0	0	0	0	0	0	0
BW0071	RN	LW	16188	4700	Y	N	N	N	50	0	0	0	0	0	0
BW0181	RN	LW	41800	4000	N	N	N	N	1	0	0	0	0	0	0
BW0186	QU	UC	12000	4940	Y	N	N	N	10	0	0	7	0	0	0
BW0187	LS	LW	1400	4740	Y	Y	N	N	0	0	0	0	0	0	0
BW0188	LS	LW	300	4640	Y	N	N	N	0	0	0	0	0	0	0
BW0189	RN	LW	6000	4640	Y	N	N	N	4	0	0	0	0	0	0
BW0190	LS	LW	40000	4660	Y	N	N	N	0	0	0	0	0	0	0
BW0191	RN	LW	500	4720	N	N	N	N	2	0	0	0	0	0	0
BW0245	RN	HG	100	5040	Y	N	N	N	1	0	0	0	0	0	0
BW0246	LS	LW	5000	4760	Y	N	Y	N	0	1	0	0	0	0	0
BW0247	LS	HG	700	5220	Y	N	N	N	0	0	0	0	0	0	0
BW0248	UN	UC	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BW0293	LS	LW	120	3890	Y	N	N	N	0	0	0	0	0	0	0
BW0438	UN	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
BW0567	QU	HG	1011	4720	Y	N	N	N	0	0	0	0	0	0	0
BW0575	LS	LW	2023	3980	Y	N	N	N	0	0	0	0	0	0	0
BW0627	CN	HG	100	5360	N	N	N	N	0	2	0	0	0	0	0
BW0628	CN	HG	5	4147	N	N	N	N	0	2	0	0	0	0	0
BW0629	AL	UP	41800	4100	N	N	N	N	0	0	2	0	0	0	0
BW0630	LS	UC	20235	4300	Y	N	N	N	1	0	0	0	0	0	0
BW0631	LS	LW	80938	4800	Y	N	N	N	0	0	0	0	0	0	0
BW0632	LS	LW	20235	4650	Y	N	N	N	0	0	0	0	0	0	0
BW0633	AL	UP	41800	4220	N	N	N	N	0	0	1	0	0	0	0
BW0635	LS	LW	80100	3860	Y	N	Y	N	0	0	0	0	0	0	0
BW0636	QU	UP	15000	5320	Y	N	N	N	0	0	0	0	0	0	0
BW0637	LS	HG	2020	5340	Y	N	N	N	1	0	0	0	0	0	0
BW0639	CN	HG	20235	5360	N	N	N	N	0	2	0	0	0	0	0
BW0640	LS	UC	20235	5100	Y	N	N	N	0	0	0	0	0	0	0
BW0641	LS	UP	2500	4320	Y	N	N	N	0	0	0	0	0	0	0
BW0642	CN	UP	900	4280	Y	N	N	N	0	2	0	0	0	0	0
BW0644	LS	UP	8094	4240	Y	N	N	N	0	0	0	0	0	0	0
BW0645	LS	HG	4040	4250	Y	N	N	N	0	0	0	0	0	0	0
BW0646	CN	UP	1	4280	N	N	N	N	0	1	0	0	0	0	0
BW0647	LS	HG	2000	4300	Y	N	N	N	0	0	0	0	0	0	0
BW0648	LS	HG	20235	4360	Y	N	N	N	0	0	0	0	0	0	0
BW0649	LS	UC	4047	5040	Y	N	N	N	0	0	0	0	0	0	0
BW0650	LS	HG	8094	4850	Y	N	N	N	0	0	0	0	0	0	0
BW0651	LS	UP	4097	4660	Y	N	N	N	0	0	0	0	0	0	0
BW0652	LS	UP	7000	4400	Y	N	N	N	0	0	0	0	0	0	0
BW0653	LS	HG	2020	4300	Y	N	Y	N	0	0	0	0	0	0	0
BW0656	RS	HG	9	4950	Y	Y	Y	N	0	0	0	0	0	0	0
BW0657	CN	UP	3	4380	Y	N	N	N	0	1	0	0	0	0	0
BW0658	LS	LW	2040	4680	Y	N	N	N	0	0	0	0	0	0	0

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SITES IN BUTTE DISTRICT

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BW0659	LS	LW	8094	4440	Y	N	N	N	0	0	0	0	0	0	0
BW0660	LS	UP	8094	4760	Y	N	N	N	0	0	0	0	0	0	0
BW0661	RN	UP	40469	4360	Y	N	N	N	9	0	0	0	0	0	0
BW0662	RN	HG	10	4850	N	N	N	N	1	0	0	0	0	0	0
BW0663	LS	UP	2023	4600	Y	N	N	N	0	0	0	0	0	0	0
BW0664	RN	UP	4097	4460	N	N	N	N	1	0	0	0	0	0	0
BW0665	CN	LW	1	4360	N	N	N	N	0	1	0	0	0	0	0
BW0666	LS	UP	101173	4880	Y	N	Y	N	0	0	0	0	0	0	0
BW0667	LS	LW	4097	5120	Y	N	N	N	0	0	0	0	0	0	0
BW0668	LS	HG	100	5140	Y	N	N	N	0	0	0	0	0	0	0
BW0669	LS	HG	4047	5040	Y	N	N	N	0	0	0	0	0	0	0
BW0670	QU	HG	61704	4680	Y	N	N	N	0	0	0	0	0	0	0
BW0671	LS	HG	2023	4850	Y	N	N	N	0	0	0	0	0	0	0
BW0672	LS	LW	4047	4840	Y	N	N	N	0	0	0	0	0	0	0
BW0675	RN	LW	60704	4950	Y	Y	N	N	64	0	0	0	0	1	0
BW0676	LS	LW	8094	4250	Y	N	N	N	0	0	0	0	0	0	0
BW0677	LS	LW	12130	4375	Y	N	N	N	0	0	0	0	0	0	0
BW0678	LS	UP	121307	5200	Y	N	N	N	0	0	0	0	0	0	0
BW0679	LS	UP	4047	4200	Y	N	N	N	0	0	0	0	0	0	0
BW0682	LS	HG	20235	5680	Y	N	N	N	0	0	0	0	0	0	0
BW0683	LS	UP	12131	5520	Y	N	N	N	0	0	0	0	0	0	0
BW0684	LS	UP	20235	5600	Y	N	N	N	0	0	0	0	0	0	0
BW0685	UN	HG	41800	5480	Y	N	N	N	0	0	0	0	0	0	0
BW0687	RS	HG	10	4850	Y	Y	N	N	0	0	0	0	0	0	0
BW0700	LS	UP	8094	5140	Y	N	N	N	0	0	0	0	0	0	0
BW0701	LS	UP	2020	5220	Y	N	N	N	0	0	0	0	0	0	0
BW0702	RN	UC	40469	5280	Y	N	N	N	2	0	0	0	0	0	0
BW0703	LS	UP	16188	5040	Y	N	N	N	0	0	0	0	0	0	0
BW0704	RN	UP	40469	5120	Y	N	N	N	6	0	0	0	0	0	0
BW0705	RN	UP	2020	4620	Y	N	N	N	1	0	0	0	0	0	0
BW0706	RN	UC	40469	4680	Y	N	N	N	11	0	0	0	0	0	0
BW0707	RN	UP	2020	4625	N	N	N	N	1	0	0	0	0	0	0
BW0708	LS	UP	8094	4550	Y	N	N	N	0	1	0	0	0	0	0
BW0709	CN	HG	2	5280	N	N	N	N	0	1	0	0	0	0	0
BW0710	LS	HG	8094	5400	Y	N	N	N	0	0	0	0	0	0	0
BW0711	LS	HG	4047	5800	Y	N	N	N	0	0	0	0	0	0	0
BW0712	LS	HG	20235	5150	Y	N	N	N	0	0	0	0	0	0	0
BW0713	LS	UP	40469	4940	Y	N	Y	N	0	0	0	0	0	0	0
BW0714	LS	HG	4047	5140	Y	N	N	N	0	0	0	0	0	0	0
BW0715	LS	HG	4047	5240	Y	N	N	N	0	0	0	0	0	0	0
BW0716	LS	LW	101173	4640	Y	N	N	N	0	0	0	0	0	0	0
BW0717	LS	HG	400	4740	Y	N	N	N	0	0	0	0	0	0	0
BW0718	LS	LW	4047	4670	Y	N	N	N	0	0	0	0	0	0	0
BW0719	QU	HG	900	4860	Y	N	N	N	0	0	0	0	0	0	0
BW0720	LS	LW	8094	4600	Y	N	N	N	0	0	0	0	0	0	0
BW0722	RN	UP	10	4510	N	N	N	N	1	0	0	0	0	0	0
BW0723	LS	LW	4047	4650	Y	N	N	N	0	0	0	0	0	0	0
BW1045	QU	LW	971280	3820	Y	N	N	N	0	0	0	0	0	0	0
CA0020	BK	UN	41800	0	N	Y	N	N	0	0	0	0	0	0	0
CA0069	LS	LW	7	0	Y	N	N	N	0	0	0	0	0	0	0
CA0140	CR	UC	8094	6100	Y	N	N	N	0	0	0	0	1	0	0
CA0141	UN	UP	41800	0	Y	N	N	N	0	0	0	0	0	0	0
DL0006	LS	LW	10000	6480	Y	N	N	N	0	0	0	0	0	0	0
DL0234	RN	UP	41800	0	N	N	N	N	1	0	0	0	0	0	0

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SITES IN BUTTE DISTRICT

Site #	St Typ	Land-Fm	Site Area Sq. M.	Elev	Lithic	Bone	FCR	Charcl	# Rings	# Cairn	# Align	# Pits	# Vsnqt	# Hrth	# Other
DL0235	LS	HG	41800	6100	Y	N	N	N	0	0	0	0	0	0	0
GA0357	LS	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
GA0359	RN	LW	41800	4420	N	N	N	N	1	0	0	0	0	0	0
GA0362	RN	LW	10000	4340	Y	N	N	N	5	0	0	0	0	0	0
GA0373	RN	HG	3000	4800	Y	N	N	N	9	0	0	0	0	0	0
GA0374	LS	HG	1200	4720	Y	N	N	N	0	0	0	0	0	0	0
GA0375	LS	UP	12500	4580	Y	N	N	N	0	0	0	0	0	0	0
GN0034	QU	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
GN0104	QU	UP	41800	0	Y	N	N	N	0	0	0	0	0	0	0
GN0105	QU	HG	41800	0	Y	N	N	N	0	0	0	0	0	0	0
GN0106	RN	LW	41800	0	Y	N	N	N	1	0	0	0	0	0	0
GN0146	UN	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
GN0304	QU	UC	101175	5980	Y	N	Y	N	0	0	0	0	0	1	0
GN0324	LS	UC	600	5880	Y	N	Y	N	0	0	0	0	0	0	0
GN0329	LS	HG	1	6200	Y	N	N	N	0	0	0	0	0	0	0
GN0331	LS	HG	3600	5220	Y	N	N	N	0	0	0	0	0	0	0
GN0332	LS	HG	4800	5320	Y	N	N	N	0	0	0	0	0	0	0
GN0334	LS	HG	4000	5680	Y	N	N	N	0	0	0	0	0	0	0
GN0338	LS	HG	100	5880	Y	N	N	N	0	0	0	0	0	0	0
GN0339	LS	HG	450	6320	Y	N	N	N	0	0	0	0	0	0	0
GN0344	LS	HG	15000	6240	Y	N	N	N	0	0	0	0	0	0	0
GN0345	LS	UC	48000	6120	Y	N	N	N	0	0	0	0	0	0	0
GN0346	QU	HG	90000	6120	Y	N	N	N	0	0	0	0	1	0	0
GN0348	LS	LW	3200	3960	Y	N	N	N	0	0	0	0	0	0	0
GN0349	LS	LW	25000	3920	Y	Y	Y	N	0	0	0	0	0	0	0
GN0350	LS	LW	150	4000	Y	N	N	N	0	0	0	0	0	0	0
GN0351	LS	LW	30	4000	Y	N	N	N	0	0	0	0	0	0	0
GN0352	LS	LW	10000	3960	Y	N	Y	N	0	0	0	0	0	0	0
GN0353	LS	LW	200000	3880	Y	N	Y	N	0	0	0	0	0	0	0
GN0378	LS	UC	6400	5880	Y	N	N	N	0	0	0	0	0	0	0
GN0380	LS	HG	2100	5800	Y	N	Y	N	0	0	0	0	0	0	0
GN0381	QU	HG	18750	5760	Y	N	N	N	0	0	0	0	0	0	0
GN0382	LS	HG	800	6240	Y	N	N	N	0	0	0	0	0	0	0
GN0383	LS	HG	100	6040	Y	N	N	N	0	0	0	0	0	0	0
GN1002	LS	LW	647520	0	Y	N	N	N	0	0	0	0	0	0	0
GN1003	LS	HG	41800	0	Y	N	N	N	0	0	0	0	0	0	0
JF0068	CN	LW	60	4720	N	N	N	N	0	11	0	0	0	0	0
JF0108	LS	HG	20235	5700	Y	Y	N	N	0	0	0	0	0	0	0
JF0139	LS	LW	90000	4860	Y	N	N	N	0	0	0	0	0	0	0
JF0173	LS	LW	5000	5250	Y	N	N	N	0	0	0	0	0	0	0
JF0177	CN	LW	200	0	N	N	N	N	0	1	0	0	0	0	0
JF0232	LS	HG	600	6060	Y	N	N	N	0	0	0	0	0	0	0
JF0233	LS	HG	7500	5920	Y	N	N	N	0	0	0	0	0	0	0
JF0234	LS	HG	12000	5920	Y	N	N	N	0	0	0	0	0	0	0
JF0235	RN	HG	6600	5880	Y	N	N	N	6	0	0	0	0	0	0
JF0236	RN	HG	150	5860	Y	N	N	N	2	0	0	0	0	0	0
JF0237	LS	UC	8100	5500	Y	N	N	Y	0	0	0	0	0	1	0
JF0238	LS	HG	30000	5960	Y	N	N	N	0	0	0	0	0	0	0
JF0239	LS	UC	41800	5720	Y	N	N	N	0	0	0	0	0	0	0
JF0243	LS	UC	500	5400	Y	N	N	N	0	0	0	0	0	0	0
JF0267	LS	HG	41800	0	Y	N	N	N	0	0	0	0	0	0	0
JF0300	LS	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
JF0467	LS	HG	93600	0	Y	N	N	N	0	0	0	0	0	0	0
JF0471	LS	UC	1800	5360	Y	N	Y	N	0	0	0	0	0	0	0

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SITES IN BUTTE DISTRICT

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JF0472	LS	UC	4800	5200	Y	N	N	N	0	0	0	0	0	0	0
JF0487	UN	UP	41800	0	Y	N	N	N	0	0	0	0	0	0	0
JF0492	LS	UC	15000	6000	Y	N	N	N	0	0	0	0	0	0	0
JF0493	LS	UC	6	5240	Y	N	N	N	0	0	0	0	0	0	0
JF0494	LS	UC	900	5200	Y	N	N	N	0	0	0	0	0	0	0
JF0498	QB	UC	200000	4700	Y	N	N	N	0	0	0	0	0	0	0
JF0499	LS	HG	750	5680	Y	Y	Y	N	0	0	0	0	0	0	0
JF0500	LS	UC	15000	5760	Y	N	N	N	0	0	0	0	0	0	0
JF0551	RN	UC	4000	5080	Y	N	N	N	1	0	0	0	0	0	0
JF0699	LS	LW	161880	5300	Y	N	N	N	0	0	0	0	0	0	0
JF0704	LS	LW	5000	4120	Y	N	N	Y	0	0	0	0	0	0	0
JF0708	LS	UC	1200	5320	Y	N	N	N	0	0	0	0	0	0	0
JF0713	LS	UC	600	5880	Y	N	N	N	0	0	0	0	0	0	0
JF0714	LS	UC	800	4760	Y	N	N	N	0	0	0	0	0	0	0
JF0715	LS	UC	900	4820	Y	N	N	N	0	0	0	0	0	0	0
JF0717	LS	UC	10	5560	Y	N	N	N	0	0	0	0	0	0	0
JF0719	LS	UP	6400	4360	Y	N	N	N	0	0	0	0	0	0	0
JF0720	QU	UP	9000	4360	Y	N	N	N	0	0	0	0	0	0	0
JF0722	LS	UC	3000	4140	Y	N	N	N	0	0	0	0	0	0	0
JF1008	LS	LW	500	4880	Y	N	N	N	0	0	0	0	0	0	0
JF1013	LS	UC	500	5300	Y	N	N	N	0	0	0	0	0	0	0
JF1015	LS	UC	4047	5100	Y	N	N	N	0	0	0	0	0	0	0
JF1022	LS	UC	100000	4800	Y	N	Y	N	1	0	0	0	0	0	0
JF9901	PC	LW	4800	5200	Y	N	N	N	0	0	0	0	0	0	1
JF9902	LS	LW	800	5280	Y	N	N	N	0	0	0	0	0	0	0
JF9903	LS	LW	5000	5240	Y	N	N	N	0	0	0	0	0	0	0
JF9904	LS	LW	1200	5120	Y	N	N	Y	0	0	0	0	0	1	0
JF9905	LS	UC	100000	4800	Y	N	N	N	1	0	0	0	0	0	0
LC0125	LS	UP	7600	4780	Y	N	N	N	0	0	0	0	0	0	0
LC0173	AL	LW	11250	4450	N	N	N	N	0	8	1	0	0	0	0
LC0179	RN	LW	5625	4430	N	N	N	N	1	0	0	0	0	0	0
LC0180	RN	UC	1500	4420	N	N	N	N	2	0	0	0	0	0	0
LC0183	RN	UC	2500	4340	N	N	N	N	9	0	0	0	0	0	0
LC0191	AL	LW	2000	4300	N	N	N	N	0	0	2	0	0	0	0
LC0194	RN	LW	150	4300	N	N	N	N	6	0	2	0	0	0	0
LC0207	RN	UP	40	4200	N	N	N	N	3	0	0	0	0	0	0
LC0208	RN	UC	75	4160	N	N	N	N	1	0	0	0	0	0	0
LC0209	RN	UP	5000	4080	Y	N	N	N	10	0	0	0	0	0	0
LC0210	RN	LW	600	4180	N	N	N	N	3	0	0	0	0	0	0
LC0613	RN	LW	363	4490	N	N	N	N	1	0	0	0	0	0	0
LC0614	RN	LW	4047	4460	Y	N	N	N	1	1	0	0	0	0	0
LC0615	LS	LW	6000	4420	Y	N	N	N	0	0	0	0	0	0	0
LC0667	LS	UC	10000	4300	Y	Y	N	N	0	1	0	0	0	0	0
LC0668	LS	LW	1000	3040	Y	N	N	N	0	0	0	0	0	0	0
LC0669	LS	LW	1000	3060	Y	N	N	N	0	0	0	0	0	0	0
LC0675	LS	HG	75	6600	Y	N	N	N	0	0	0	0	0	0	0
LC0677	CN	UP	4000	4450	N	N	N	N	0	5	0	0	0	0	0
LC0678	RN	LW	600	4300	N	N	N	N	2	0	0	0	0	0	0
LC0679	LS	LW	500	4350	Y	N	N	N	0	0	0	0	0	0	0
LC0680	CN	UC	700	4400	Y	N	N	N	0	1	0	0	0	0	0
LC0699	RN	UC	450	4420	Y	N	N	N	1	0	0	0	0	0	0
LC0707	RN	UP	2500	4100	Y	Y	N	N	6	0	0	0	0	0	0
LC0711	LS	HG	700	0	Y	N	N	N	0	0	0	0	0	0	0
LC1001	RN	HG	5000	6400	N	N	N	N	1	0	0	0	0	0	0

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SITES IN BUTTE DISTRICT

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LC1008	LS	UC	8000	6240	Y	N	N	N	0	0	0	0	0	0	0
LC1009	LS	UC	45	6400	Y	N	N	N	0	0	0	0	0	0	0
LC1010	LS	UC	2000	6560	Y	N	N	N	0	0	0	0	0	0	0
LC1037	RN	LW	250	0	Y	N	N	N	1	0	0	0	0	0	0
MA0034	PC	HG	20	0	N	N	N	N	0	0	0	0	0	0	1
MA0038	LS	UC	1000	5800	Y	N	N	N	0	0	0	0	0	0	0
MA0040	LS	UC	1000	5300	Y	N	N	N	0	0	0	0	0	0	0
MA0056	LS	HG	41800	0	Y	N	N	N	0	0	0	0	0	0	0
MA0059	LS	UC	4047	7320	Y	N	N	N	0	0	0	0	0	0	0
MA0060	CN	HG	41800	8140	N	N	N	N	0	1	0	0	0	0	0
MA0061	QU	BR	20235	5500	Y	N	N	N	0	0	0	0	0	0	0
MA0062	LS	UC	4047	6320	Y	N	N	N	0	0	0	0	0	0	0
MA0064	QU	UC	4047	5640	Y	N	N	N	0	0	0	0	0	0	0
MA0065	LS	HG	8094	6500	Y	N	N	N	0	0	0	0	0	0	0
MA0070	LS	HG	1000	8420	Y	N	N	N	0	0	0	0	0	0	0
MA0071	LS	HG	10	7300	Y	N	N	N	0	0	0	0	0	0	0
MA0072	CN	UC	100	6050	N	N	N	N	0	2	0	0	0	0	0
MA0077	LS	UC	100	7500	Y	N	N	N	0	0	0	0	0	0	0
MA0078	LS	HG	100	7400	Y	N	N	N	0	0	0	0	0	0	0
MA0079	LS	UC	100	7100	Y	N	N	N	0	0	0	0	0	0	0
MA0080	RN	LW	647529	0	Y	N	N	N	1	0	0	0	0	0	0
MA0081	WK	UC	25	7580	N	N	N	N	0	0	0	0	0	0	1
MA0082	RN	UC	80940	7800	Y	N	N	N	2	0	0	0	0	0	0
MA0083	LS	UC	1000	7450	Y	N	N	N	0	0	0	0	0	0	0
MA0084	LS	UC	100	7650	Y	N	N	N	0	0	0	0	0	0	0
MA0085	LS	UC	100	8050	Y	N	N	N	0	0	0	0	0	0	0
MA0086	LS	UC	41800	8300	Y	N	N	N	0	0	0	0	0	0	0
MA0121	QO	UC	510	8100	Y	N	N	N	0	0	0	0	0	0	0
MA0149	QU	LW	80940	4600	Y	N	N	N	0	0	0	0	0	0	0
MA0150	LS	LW	10	4550	Y	N	N	N	0	0	0	0	0	0	0
MA0152	AL	HG	41800	5700	N	N	N	N	0	0	1	0	0	0	0
MA0153	LS	LW	10	4700	Y	N	N	N	0	0	0	0	0	0	0
MA0157	AL	HG	40470	5800	N	N	N	N	0	0	2	0	0	0	0
MA0158	CN	UP	3	5280	N	N	N	N	0	1	0	0	0	0	0
MA0159	CN	UC	41800	0	N	N	N	N	0	1	0	0	0	0	0
MA0162	LS	UC	100	7200	Y	Y	N	N	0	0	0	0	0	0	0
MA0163	LS	UC	3	7200	Y	N	N	N	0	0	0	0	0	0	0
MA0164	RN	HG	9	8080	N	N	N	N	1	0	0	0	1	0	0
MA0167	PT	UN	10	0	N	N	N	N	0	0	0	1	0	0	0
MA0168	LS	HG	80940	7700	Y	N	N	N	0	0	0	0	0	0	0
MA0169	QU	HG	4047	6700	Y	N	N	N	0	0	0	0	0	0	0
MA0170	LS	UP	41800	0	Y	N	N	N	0	0	0	0	0	0	0
MA0224	BK	LW	100	4450	N	Y	N	N	0	0	0	0	0	0	0
MA0225	RN	LW	80000	4480	Y	N	N	N	45	6	0	0	0	0	0
MA0226	RN	LW	12141	4450	Y	N	N	N	20	0	0	0	0	0	0
MA0227	RN	LW	1200	4450	Y	N	N	N	4	0	0	0	0	0	0
MA0228	RN	LW	8094	4560	Y	N	N	N	10	0	0	0	0	0	0
MA0229	RN	LW	4800	4520	Y	N	N	N	4	0	0	0	0	0	0
MA0230	RN	LW	6250	4600	Y	N	N	N	4	0	0	0	0	0	0
MA0231	RN	LW	1600	4520	Y	N	N	N	2	0	0	0	0	0	0
MA0232	LS	LW	25000	4490	Y	N	Y	Y	0	0	0	0	0	2	0
MA0233	LS	LW	15000	4520	Y	N	Y	N	0	0	0	0	0	0	0
MA0234	LS	LW	7500	4500	Y	Y	N	N	0	0	0	0	0	0	0
MA0235	LS	LW	7500	4500	Y	Y	Y	Y	0	0	0	0	0	0	0

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MA0236	LS	LW	3200	4480	Y	N	N	N	0	0	0	0	0	0	0
MA0237	LS	LW	3200	4480	Y	N	N	N	0	0	0	0	0	0	0
MA0238	LS	UC	4047	5880	Y	N	N	N	0	0	0	0	0	0	0
MA0239	LS	HG	4047	6820	Y	N	N	N	0	0	0	0	0	0	0
MA0240	RN	UC	4047	6580	Y	N	N	N	3	0	0	0	0	0	0
MA0241	LS	UC	12	6360	Y	N	N	N	0	0	0	0	0	0	0
MA0251	LS	UC	4047	7400	Y	N	N	N	0	0	0	0	0	0	0
MA0252	RN	LW	4047	4840	Y	N	N	N	2	0	0	0	0	0	0
MA0254	LS	LW	20235	0	Y	N	N	N	0	0	0	0	0	0	0
MA0255	LS	LW	8094	4560	Y	N	N	N	0	0	0	0	0	0	0
MA0266	CN	HG	4	0	N	N	N	N	0	1	0	0	0	0	0
MA0268	CR	HG	12	5800	N	N	N	N	0	0	0	0	1	0	0
MA0271	LS	UC	2023	6300	Y	N	N	N	0	0	0	0	0	0	0
MA0272	AL	UP	8000	6120	N	N	N	N	0	0	1	0	0	0	0
MA0273	LS	HG	4047	5920	Y	N	N	N	0	0	0	0	0	0	0
MA0274	LS	HG	2023	5400	Y	N	N	N	0	0	0	0	0	0	0
MA0277	LS	UC	4047	5580	Y	N	N	N	0	0	0	0	0	0	0
MA0280	AL	HG	6400	5400	N	N	N	N	1	0	1	0	0	0	0
MA0281	LS	HG	8094	5740	Y	N	N	N	0	0	0	0	0	0	0
MA0282	LS	HG	8094	5820	Y	N	Y	N	0	0	0	0	0	2	0
MA0283	LS	HG	4047	6480	Y	N	N	N	0	0	0	0	0	0	0
MA0284	LS	HG	4047	6320	Y	N	N	N	0	0	0	0	0	0	0
MA0294	RN	UN	41800	0	N	N	N	N	1	0	0	0	0	0	0
MA0304	UN	LW	41800	4460	Y	N	N	N	0	0	0	0	0	0	0
MA0305	RS	LW	100	4640	Y	N	N	N	0	0	0	0	0	0	1
MA0330	RN	HG	500	5800	Y	N	N	N	1	0	0	0	0	0	0
MA0351	RN	LW	525	4460	Y	N	N	N	1	0	0	0	0	0	0
MA0352	LS	LW	3000	4480	Y	N	N	N	0	0	0	0	0	0	0
MA0353	RN	LW	800	4480	Y	N	N	N	1	0	0	0	0	0	0
MA0354	LS	LW	50	4460	Y	N	N	N	0	0	0	0	0	0	0
MA0357	LS	LW	600	5560	Y	N	N	N	0	0	0	0	0	0	0
MA0358	LS	UC	1400	7500	Y	N	N	N	0	0	0	0	0	0	0
MA0359	LS	UC	4800	7520	Y	N	N	N	0	0	0	0	0	0	0
MA0360	LS	HG	64	7640	Y	N	N	N	0	0	0	0	0	0	0
MA0361	CN	HG	10	7080	N	N	N	N	0	1	0	0	0	0	0
MA0362	CR	HG	11400	7020	N	N	N	N	0	2	0	0	1	0	0
MA0363	CR	HG	3000	6920	Y	N	N	N	0	0	0	0	7	0	0
MA0364	LS	UC	700	8200	Y	N	N	N	0	0	0	0	0	0	0
MA0369	LS	UC	2960	7200	Y	N	N	N	0	0	0	0	0	0	0
MA0370	LS	UC	500	8040	Y	N	N	N	0	0	0	0	0	0	0
MA0372	LS	HG	1000	6600	Y	N	N	N	0	0	0	0	0	0	0
MA0375	LS	HG	2625	6200	Y	N	N	N	0	0	0	0	0	0	0
MA0377	RN	LW	1600	5640	Y	N	N	N	3	0	0	0	0	0	0
MA0378	LS	UC	2500	7720	Y	N	N	N	0	0	0	0	0	0	0
MA0380	LS	UC	800	7920	Y	N	N	N	0	0	0	0	0	0	0
MA0381	LS	UC	10	7640	Y	N	N	N	0	0	0	0	0	0	0
MA0383	QO	HG	140	8200	Y	N	N	N	0	0	0	0	0	0	0
MA0384	LS	HG	80	7520	Y	N	N	N	0	0	0	0	0	0	0
MA0385	QO	HG	2250	7900	Y	N	N	N	0	0	0	0	0	1	0
MA0387	BK	UC	6500	6700	Y	Y	N	Y	0	0	0	0	0	0	0
MA0388	LS	HG	161880	6780	Y	N	N	N	0	0	0	0	0	0	0
MA0389	RN	UC	41800	6300	Y	N	N	N	1	0	0	0	0	0	0
MA0391	LS	UC	10	6520	Y	N	N	N	0	0	0	0	0	0	0
MA0394	CN	HG	50	6540	N	N	N	N	0	2	0	0	0	0	0

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MA0395	LS	LW	150	5460	Y	N	N	N	0	0	0	0	0	0	0
MA0396	LS	LW	5000	5460	Y	N	N	N	0	0	0	0	0	0	0
MA0397	RN	LW	2500	5480	Y	N	N	N	5	2	0	0	0	0	0
MA0398	RN	LW	825	5400	Y	N	N	N	1	0	0	0	0	0	0
MA0399	RN	LW	2500	5400	Y	N	N	N	7	0	0	0	0	0	0
MA0401	LS	LW	150	5420	Y	N	N	N	0	0	0	0	0	0	0
MA0402	CN	LW	1	5410	N	N	N	N	0	1	0	0	0	0	0
MA0403	LS	LW	5000	5360	Y	N	N	N	0	0	0	0	0	0	0
MA0404	LS	UP	600	5520	Y	N	N	N	0	0	0	0	0	0	0
MA0405	QU	UP	4500	4840	Y	N	N	N	0	0	0	0	0	0	0
MA0406	QU	HG	12500	4760	Y	N	N	N	0	0	0	0	0	0	0
MA0407	LS	HG	1000	7520	Y	N	N	N	0	0	0	0	0	0	0
MA0551	RN	LW	41470	4540	Y	N	N	N	20	0	0	0	0	0	0
MA0552	LS	LW	58564	4560	Y	Y	N	Y	0	0	0	0	0	0	0
MA0556	RN	LW	60705	4460	Y	N	N	N	50	0	0	0	0	0	0
MA0557	LS	LW	20235	4460	Y	Y	N	Y	0	0	0	0	0	0	0
MA0561	AL	UC	30	0	N	N	N	N	0	0	1	0	0	0	0
MA0568	CR	UC	200	6100	Y	Y	N	N	0	0	0	0	0	0	1
MA0601	WK	UC	150	0	Y	N	N	N	0	0	0	0	0	1	1
MA0602	WK	UC	16	0	N	N	N	N	0	0	0	0	0	0	1
MA1003	PC	UC	10	5280	N	N	N	N	0	0	0	0	0	0	1
MA1030	RN	HG	10000	6060	Y	N	N	N	23	1	0	0	0	0	0
MA1041	BK	LW	40470	0	Y	Y	N	N	0	0	1	0	0	0	0
MA1042	BK	UC	200000	5640	Y	Y	N	N	60	1	2	0	0	0	0
MA1235	LS	HG	1	6400	Y	N	N	N	0	0	0	0	0	0	0
MA9901	LS	HG	9600	7320	Y	N	N	N	0	2	0	0	0	0	0
MA9902	LS	HG	1500	7000	Y	N	N	N	0	0	0	0	0	0	0
MA9903	LS	HG	4000	7040	Y	N	N	N	0	0	0	0	0	0	0
MA9904	LS	LW	1200	4960	Y	N	N	N	0	0	0	0	0	0	0
MA9905	HE	UC	1	5200	N	N	Y	N	0	0	0	0	0	1	0
MA9906	BK	UC	10000	5560	Y	Y	N	N	0	0	1	0	0	0	0
ME0196	LS	LW	28329	4440	Y	N	N	N	0	0	0	0	0	0	0
ME0197	RN	LW	4047	4440	Y	N	N	N	1	0	0	0	0	0	0
MO0165	LS	HG	5000	5400	Y	N	N	N	0	0	0	0	0	0	0
MO0166	LS	LW	40000	3800	Y	N	N	N	0	0	0	0	0	0	0
MO0167	LS	LW	200	3920	Y	N	N	N	0	0	0	0	0	0	0
MO0168	LS	UC	5000	0	Y	N	N	N	0	0	0	0	0	0	0
MO0170	QU	HG	8100	6020	Y	N	N	N	0	0	0	0	0	0	0
PA0176	CN	HG	41800	0	N	N	N	N	0	1	0	0	0	0	0
PA0180	LS	HG	1	0	Y	N	N	N	0	0	0	0	0	0	0
PA0182	LS	UC	400	0	Y	N	N	N	0	0	0	0	0	0	0
PA0341	LS	UC	300	5600	Y	Y	N	N	0	0	0	0	0	0	0
PA0420	UN	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
PA0652	LS	LW	80000	0	Y	N	Y	Y	0	0	0	0	0	0	0
PW0091	LS	UC	20235	6240	Y	N	N	N	0	0	0	0	0	0	0
PW0092	LS	HG	100	6570	Y	N	N	N	0	0	0	0	0	0	0
PW0093	LS	HG	41800	6710	Y	N	N	N	0	0	0	0	0	0	0
PW0094	TR	UC	41800	4920	N	N	N	N	0	0	0	0	0	0	0
PW0099	LS	UN	41800	0	Y	N	N	N	0	0	0	0	0	0	0
PW0100	LS	UN	12141	0	Y	N	N	N	0	0	0	0	0	0	0
PW0102	LS	LW	41800	0	Y	N	N	N	0	0	0	0	0	0	0
PW0103	LS	LW	41800	0	Y	N	N	N	0	0	0	0	0	0	0
PW0113	QU	UC	5000	5800	Y	N	N	N	0	0	0	0	0	0	0
PW0115	LS	UC	18000	5980	Y	N	N	N	0	0	0	0	0	0	0

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PW0179	LS	UC	100	5320	Y	N	N	N	0	0	0	0	0	0	0
PW0180	LS	HG	10000	6840	Y	N	N	N	0	0	0	0	0	0	0
PW0181	LS	HG	3200	6880	Y	N	N	N	0	0	0	0	0	0	0
PW0182	LS	HG	30000	6880	Y	N	N	N	0	0	0	0	0	0	0
PW0184	LS	HG	6750	6900	Y	N	N	N	0	0	0	1	0	0	0
PW0222	LS	UC	40000	5400	Y	N	N	N	0	0	0	0	0	0	0
PW0223	LS	UC	1600	5480	Y	N	N	N	0	0	0	0	0	0	0
PW0226	LS	HG	1500	6000	Y	N	N	N	0	0	0	0	0	0	0
PW0232	LS	UC	10	5640	Y	N	N	N	0	0	0	0	0	0	0
PW0239	LS	UC	4800	6640	Y	N	N	N	0	0	0	0	0	0	0
PW0244	LS	UC	6000	5040	Y	N	N	N	0	0	0	0	0	0	0
PW0245	LS	HG	10000	5800	Y	N	N	N	0	0	0	0	0	0	0
PW0246	LS	HG	100	4820	Y	N	N	N	0	0	0	0	0	0	0
PW0247	LS	UC	4250	4580	Y	N	N	N	0	0	0	0	0	0	0
PW0248	LS	HG	5000	5380	Y	N	N	N	0	0	0	0	0	0	0
PW1006	LS	UN	20235	0	Y	N	N	N	0	0	0	0	0	0	0
SB0084	RS	UN	10	0	Y	N	N	N	0	0	0	0	0	0	0
SB0168	AL	HG	4000	6760	N	N	N	N	0	0	1	0	0	0	0
SB0169	LS	HG	30	6780	Y	N	N	N	0	0	0	0	0	0	0
SB0170	LS	HG	60	6000	Y	N	N	N	0	0	0	0	0	0	0
SB0171	LS	UC	4047	6880	Y	Y	N	N	0	0	0	0	0	0	0
SB0172	LS	UC	4047	6880	Y	N	N	N	0	0	0	0	0	0	0
SB0173	CN	HG	4	0	N	N	N	N	0	1	0	0	0	0	0
SB0191	LS	UC	4047	5880	Y	Y	N	N	0	0	0	0	0	0	0
SB0194	PT	UP	4	5480	N	Y	N	N	0	0	0	1	0	0	0
SB0198	LS	LW	240	0	Y	N	N	N	0	0	0	0	0	0	0
SB0200	LS	UC	10000	6740	Y	N	N	N	0	0	0	0	0	0	0
SB1003	CR	HG	1942560	5800	Y	N	N	N	1	100	12	0	0	0	0
SB1009	RN	HG	647520	0	Y	N	N	N	1	0	0	0	0	0	0
SB9901	PT	LW	4	5600	Y	N	N	N	0	0	0	1	0	0	0
TT0055	CR	HG	40470	8580	N	N	N	N	0	0	0	0	1	0	0
TT0056	LS	UP	120	6210	Y	Y	N	N	0	0	0	0	0	0	0
TT0057	LS	UC	8094	5460	Y	N	N	N	0	0	0	0	0	0	0
TT0058	UN	LW	4047	4410	N	N	N	N	0	0	0	0	0	0	1
TT0059	LS	LW	225	4400	Y	N	N	N	0	0	0	0	0	0	0
TT0060	RN	UP	41800	0	N	N	N	N	1	0	0	0	0	0	0
TT0068	BK	LW	41800	0	Y	Y	N	N	0	0	0	0	0	0	0
TT0069	LS	UP	5000	0	Y	N	N	N	0	0	0	0	0	0	0
TT0071	BK	LW	900	0	Y	Y	N	N	0	0	0	0	0	0	0
TT0072	BK	LW	1800	0	Y	Y	N	N	0	0	0	0	0	0	0
TT0073	CR	HG	75	0	Y	N	N	N	0	1	0	0	1	0	0
TT0074	LS	UP	800	0	Y	N	N	N	0	0	0	0	0	0	0

SITE TYPES: AL=ALIGNMENT, BK=BISON KILL, CN=CAIRN, CR=CEREMONIAL, HE=HEARTH, LS=LITHIC SCATTER, PC=ROCK ART, PT=PITS OR BLINDS, Q__=QUARRY(__=MATERIAL TYPE), RN=RING, RS=ROCKSHELTER, TR=TRAIL, UN=UNKNOWN, WK=WICKIUP.

LANDFORMS: BR=BREAKS, HG=HIGHLANDS, LW=LOWLANDS, UC=CREEKSIDE, UN=UNKNOWN, UP=UPLANDS.

MATERIAL TYPE: O=OBSIDIAN/IGNUMBRITE, C=CHERT/CHALCEDONY, B=BASALT, U=UNKNOWN.

Appendix II: Diagnostics from Sites

DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
Site #	Site Type	Land-Frm	Site Area Sq. M.	E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
BE0029	LS	LW	250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0030	LS	LW	10000	0	1	0	0	0	1	0	1	1	0	0	0	0	0	0
BE0031	LS	BR	232	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BE0033	QO	LW	2590080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0034	LS	LW	2500	0	0	0	0	0	0	0	0	1	0	0	1	0	3	0
BE0035	LS	BR	10000	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BE0036	CN	BR	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0039	LS	LW	22500	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BE0040	LS	BR	323760	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
BE0041	LS	LW	5500	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BE0042	LS	BR	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0043	LS	BR	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0044	LS	BR	160000	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BE0046	LS	BR	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0047	LS	LW	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0048	LS	LW	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0050	LS	UC	1250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0051	LS	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0052	LS	BR	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0054	LS	UN	750	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0056	LS	LW	15000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0059	LS	LW	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0061	QO	HG	480000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0063	LS	HG	60000	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BE0064	LS	HG	20000	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0065	LS	LW	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0066	LS	LW	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0071	RN	UC	40000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0166	TR	UC	1295040	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0180	LS	UC	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0181	LS	LW	250000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0189	BK	BR	160000	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
BE0190	RN	UC	20000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0192	PT	HG	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0194	LS	UC	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0195	LS	UC	10000	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
BE0207	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0208	CN	HG	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0209	CN	HG	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0210	LS	UC	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0211	LS	UC	20000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0212	LS	HG	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0215	QU	UC	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0217	QU	HG	101175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0218	LS	LW	404700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0219	LS	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0220	CR	HG	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0221	LS	UP	16188	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BE0227	LS	UP	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0231	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0232	LS	LW	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0233	LS	LW	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0256	LS	UC	60000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0257	QU	HG	160000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0264	LS	HG	45000	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0278	QU	HG	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0281	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE TYPES: AL=ALIGNMENT, BK=BISON KILL, CN=CAIRN, CR=CEREMONIAL, HE=HEARTH, LS=LITHIC SCATTER, PC=ROCK ART, PT=PITS OR BLINDS, Q__=QUARRY(__=MATERIAL TYPE), RN=RING, RS=ROCKSHELTER, TR=TRAIL, UN=UNKNOWN, WK=WICKIUP.

LANDFORMS: BR=BREAKS, HG=HIGHLANDS, LW=LOWLANDS, UC=CREEKSIDE, UN=UNKNOWN, UP=UPLANDS.

MATERIAL TYPE: O=OBSIDIAN/IGNUMBRITE, C=CHERT/CHALCEDONY, B=BASALT, U=UNKNOWN.

DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
Site #	Site Type	Land-Frm	Site Area Sq. M.	E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
BE0282	LS	HG	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0283	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0284	LS	HG	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0285	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0286	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0287	LS	UC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0288	LS	HG	8094	0	0	0	0	0	0	0	1	2	0	0	0	0	1	0
BE0289	CR	HG	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0290	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
BE0291	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0292	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0293	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0295	LS	LW	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0296	LS	UC	12141	0	0	0	0		0	0	0	0	0	0	0	0	0	0
BE0297	LS	HG	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0298	LS	LW	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0300	LS	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0401	RS	HG	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0402	LS	HG	68799	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0403	CN	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0404	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0407	LS	HG	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0410	CN	HG	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0411	UN	UC	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0412	CN	HG	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0413	LS	HG	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0414	LS	UC	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0415	LS	UC	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0417	QU	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0418	LS	UC	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0419	LS	LW	242820	0	0	1	0	0	0	0	0	1	0	0	0	0	3	0
BE0420	CN	HG	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0421	QB	HG	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0422	LS	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0425	RN	HG	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0426	RN	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0428	LS	HG	121410	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0429	QO	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0430	LS	HG	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0431	LS	HG	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0432	QO	HG	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0433	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0434	CR	HG	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0435	QO	HG	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0436	LS	UC	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0437	LS	UC	4500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0438	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0440	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0442	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0443	QO	HG	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0444	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0445	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0446	WK	HG	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0447	CN	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0448	RN	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0449	LS	LW	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0450	LS	LW	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0453	LS	LW	272	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
Site #	Site Type	Land-Frm	Site Area Sq. M.	E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
BE0454	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0455	LS	UC	242820	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0456	CN	UN	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
BE0457	BK	UN	323760	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0458	AL	UN	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0459	LS	UN	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0460	LS	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0462	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0463	LS	HG	6070	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
BE0464	LS	UN	4047	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
BE0465	AL	UN	6070	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
BE0466	RN	LW	202350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0467	LS	UP	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0468	LS	UP	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0469	QB	UP	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0470	QC	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0486	LS	LW	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0501	LS	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0502	LS	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0503	LS	UP	6000	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
BE0504	LS	LW	5500	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0
BE0506	LS	HG	225	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0507	LS	UC	30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0559	QU	UP	60705	0	0	1	0	4	0	1	0	18	0	0	9	0	21	2
BE0601	WK	HG	1011	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
BE0637	LS	UP	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0653	LS	LW	161880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0654	CN	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0655	TR	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0659	CN	HG	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0660	RN	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0661	QU	UC	161880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0665	RN	UC	196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0666	RN	UC	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0667	RN	UC	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0668	RN	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0669	RN	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0670	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0671	LS	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0674	UN	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0675	LS	UC	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0676	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0677	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0678	CN	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0679	UN	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0680	LS	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0681	QU	HG	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0682	QU	HG	647520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0684	LS	UP	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0685	LS	UC	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0686	LS	UC	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0688	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0689	LS	LW	80940	0	0	1	0	0	0	0	0	1	0	0	0	0	2	0
BE0690	RN	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0691	LS	LW	80940	0	0	1	0	0	0	0	0	0	1	0	1	1	0	0
BE0692	LS	LW	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0693	RN	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0694	PT	UC	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ITE TYPES: AL=ALIGNMENT, BK=BISON KILL, CN=CAIRN, CR=CEREMONIAL, HE=HEARTH, LS=LITHIC SCATTER, C=ROCK ART, PT=PITS OR BLINDS, Q__=QUARRY(__=MATERIAL TYPE), RN=RING, RS=ROCKSHELTER, TR=TRAIL, N=UNKNOWN, WK=WICKIUP.

ANDFORMS: BR=BREAKS, HG=HIGHLANDS, LW=LOWLANDS, UC=CREEKSIDE, UN=UNKNOWN, UP=UPLANDS.

ATERIAL TYPE: O=OBSIDIAN/IGNUMBRITE, C=CHERT/CHALCEDONY, B=BASALT, U=UNKNOWN.

DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
Site #	Site Type	Land-Frm	Site Area Sq. M.	E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
BE0695	LS	LW	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0696	LS	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0697	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0699	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0700	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0701	LS	HG	3120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0702	LS	HG	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0703	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0704	LS	HG	14764	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0705	LS	UC	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0706	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0707	LS	UC	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0708	LS	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0709	LS	HG	50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0710	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0711	LS	UC	50	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
BE0712	LS	UC	16188	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0713	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0714	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0715	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0716	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0717	LS	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0718	LS	HG	161880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0720	UN	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0721	LS	UC	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0722	LS	UC	20235	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
BE0723	LS	UC	100	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0724	LS	UC	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0725	LS	UC	900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0726	LS	UC	1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0727	QU	UC	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0728	CN	HG	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0730	LS	UC	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0731	LS	UC	6000	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0
BE0732	LS	UC	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0733	CN	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0734	LS	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0735	CR	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0736	LS	UC	4047	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0
BE0737	UN	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0738	LS	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0739	LS	UP	202350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0740	LS	UC	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0741	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0742	QU	UC	1942560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0743	CN	UC	647520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0744	CN	UC	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0745	CR	HG	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0746	CN	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0747	LS	UC	4047	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0
BE0748	CN	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0750	LS	UC	100	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BE0751	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0752	UN	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0753	CN	UC	400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0754	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0755	LS	LW	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0756	LS	LW	133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE TYPES: AL=ALIGNMENT, BK=BISON KILL, CN=CAIRN, CR=CEREMONIAL, HE=HEARTH, LS=LITHIC SCATTER, PC=ROCK ART, PT=PITS OR BLINDS, Q__=QUARRY(__=MATERIAL TYPE), RN=RING, RS=ROCKSHELTER, TR=TRAIL, UN=UNKNOWN, WK=WICKIUP.

LANDFORMS: BR=BREAKS, HG=HIGHLANDS, LW=LOWLANDS, UC=CREEKSIDE, UN=UNKNOWN, UP=UPLANDS.

MATERIAL TYPE: O=OBSIDIAN/IGNUMBRITE, C=CHERT/CHALCEDONY, B=BASALT, U=UNKNOWN.

DIAGNOSTICS FROM SITES

Site #	Site Type	Land-Frm	Site Area Sq. M.	# DIAGNOSTICS E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
BE0757	QU	HG	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
BE0758	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0759	LS	UC	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0760	RN	UC	100	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0761	CN	UC	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0762	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0763	LS	UC	8094	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BE0764	LS	UC	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0767	UN	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0768	LS	HG	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0769	LS	UC	121410	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0771	LS	UC	20235	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BE0773	UN	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0774	LS	UC	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0775	LS	UC	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0776	LS	HG	16188	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0777	UN	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0780	RN	UC	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0781	LS	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0782	RN	HG	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0783	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0784	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0785	RN	BR	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0786	LS	LW	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0820	RN	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0822	LS	HG	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0823	LS	HG	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0824	QU	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0825	LS	UC	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0826	QU	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0827	LS	UC	485640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0828	LS	UC	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0830	UN	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0831	RN	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0833	LS	HG	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0834	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0835	RN	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0837	AL	LW	7500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0839	LS	UC	4047	0	0	1	0	0	0	0	0	0	0	0	0	0	3	0
BE0840	LS	UC	4047	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BE0841	LS	UC	12141	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BE0844	LS	HG	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0846	LS	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0847	LS	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0848	CN	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0850	LS	UC	20235	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0
BE0851	CN	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0853	QU	HG	161880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0854	AL	HG	2590080	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0855	AL	HG	1942560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0859	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0860	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0861	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E0862	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E0863	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E0864	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E0865	CR	HG	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E0866	RN	HG	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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ATERIAL TYPE: O=OBSIDIAN/IGNUMBRITE, C=CHERT/CHALCEDONY, B=BASALT, U=UNKNOWN.

DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
Site #	Site Type	Land-Frm	Site Area Sq. M.	E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
BE0867	LS	HG	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0868	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0869	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0875	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0876	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0877	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0878	LS	UC	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0879	LS	UC	2400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0880	LS	UC	10000	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1
BE0881	LS	LW	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0882	LS	UC	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0883	TR	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0885	PT	UC	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0887	LS	LW	1798	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0888	LS	UP	7000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0889	LS	UC	2450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0892	LS	UC	40000	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0
BE0894	LS	LW	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0895	PT	UC	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0896	LS	UC	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0902	LS	UC	8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0905	LS	UC	7000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0906	LS	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0908	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0909	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0910	LS	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0914	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0915	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0916	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0919	LS	HG	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0920	LS	HG	80940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0921	LS	UC	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0923	RN	LW	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0930	LS	LW	63	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0931	LS	UC	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0932	RN	UP	450	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0935	LS	HG	750	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
BE0936	LS	LW	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0937	LS	UP	2100	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0
BE0952	LS	HG	1500	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
BE0953	LS	HG	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0954	LS	UC	8000	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
BE0955	LS	UC	17000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0956	LS	UC	3000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0957	QU	UP	148750	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0
BE0958	LS	UC	154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0959	CN	HG	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0960	CN	HG	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0961	HE	LW	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0962	LS	UC	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0963	LS	HG	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0965	LS	UC	20000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0966	CN	UC	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0968	LS	UC	10000	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0
BE0969	LS	LW	300	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
BE0970	LS	HG	800	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0

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LANDFORMS: BR=BREAKS, HG=HIGHLANDS, LW=LOWLANDS, UC=CREEKSIDE, UN=UNKNOWN, UP=UPLANDS.

MATERIAL TYPE: O=OBSIDIAN/IGNUMBRITE, C=CHERT/CHALCEDONY, B=BASALT, U=UNKNOWN.

DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
Site #	Site Type	Land-Frm	Site Area Sq. M.	E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
BE0971	LS	HG	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0972	LS	HG	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0973	LS	HG	500	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0
BE0974	LS	LW	1000	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0
BE0975	CN	HG	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0976	LS	HG	8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0977	LS	HG	25	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BE0981	LS	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0982	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0983	LS	UC	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0990	LS	UC	15000	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BE0991	LS	UP	400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0992	LS	UP	13500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0994	LS	UC	6000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE0995	LS	HG	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE1001	LS	UC	150	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
BE1024	LS	LW	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE1025	LS	LW	100	0	0	0	0	0	0	0	0	0	0	0	1	0	5	0
BE1026	LS	CN	80940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE1028	AL	UP	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE1033	UN	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE1065	LS	UC	7500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE1067	LS	LW	5000	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0
BE9901	LS	UC	100	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
BE9902	LS	UC	2100	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0
BE9903	LS	HG	200	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
BE9904	LS	HG	150	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
BE9905	LS	HG	8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE9906	LS	HG	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE9907	LS	HG	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE9908	LS	HG	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE9909	LS	UC	11500	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
BE9910	LS	UC	2400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE9911	LS	UC	104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE9912	LS	UC	10625	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE9913	LS	UC	5950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0061	RN	LW	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
BW0063	LS	UC	250000	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0
BW0070	LS	UC	121410	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0071	RN	LW	16188	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0181	RN	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0186	QU	UC	12000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0187	LS	LW	1400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0188	LS	LW	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0189	RN	LW	6000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0190	LS	LW	40000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0191	RN	LW	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0245	RN	HG	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0246	LS	LW	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0247	LS	HG	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0248	UN	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0293	LS	LW	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0438	UN	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0567	QU	HG	1011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0575	LS	LW	2023	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0627	CN	HG	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0628	CN	HG	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
Site #	Site Type	Land-Frm	Site Area Sq. M.	E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
BW0629	AL	UP	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0630	LS	UC	20235	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
BW0631	LS	LW	80938	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
BW0632	LS	LW	20235	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0633	AL	UP	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0635	LS	LW	80100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0636	QU	UP	15000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0637	LS	HG	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0639	CN	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0640	LS	UC	20235	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0641	LS	UP	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0642	CN	UP	900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0644	LS	UP	8094	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0645	LS	HG	4040	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BW0646	CN	UP	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0647	LS	HG	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0648	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0649	LS	UC	4047	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0650	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0651	LS	UP	4097	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0652	LS	UP	7000	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0653	LS	HG	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0656	RS	HG	9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BW0657	CN	UP	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0658	LS	LW	2040	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0659	LS	LW	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0660	LS	UP	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0661	RN	UP	40469	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0662	RN	HG	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0663	LS	UP	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0664	RN	UP	4097	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0665	CN	LW	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0666	LS	UP	101173	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
BW0667	LS	LW	4097	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0668	LS	HG	100	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0669	LS	HG	4047	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0670	QU	HG	61704	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0671	LS	HG	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0672	LS	LW	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0675	RN	LW	60704	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
BW0676	LS	LW	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0677	LS	LW	12130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0678	LS	UP	121307	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
BW0679	LS	UP	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0682	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BW0683	LS	UP	12131	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BW0684	LS	UP	20235	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0685	UN	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0687	RS	HG	10	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0700	LS	UP	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0701	LS	UP	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0702	RN	UC	40469	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
BW0703	LS	UP	1618	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0
BW0704	RN	UP	40469	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BW0705	RN	UP	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0706	RN	UC	40469	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0707	RN	UP	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0708	LS	UP	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
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BW0709	CN	HG	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0710	LS	HG	8094	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0711	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0712	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0713	LS	UP	40469	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
BW0714	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0715	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0716	LS	LW	101173	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0717	LS	HG	400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0718	LS	LW	4047	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
BW0719	QU	HG	900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0720	LS	LW	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0722	RN	UP	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW0723	LS	LW	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BW1045	QU	LW	971280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CA0020	BK	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CA0069	LS	LW	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CA0140	CR	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CA0141	UN	UP	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DL0006	LS	LW	10000	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
DL0234	RN	UP	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DL0235	LS	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GA0357	LS	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GA0359	RN	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GA0362	RN	LW	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GA0373	RN	HG	3000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GA0374	LS	HG	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GA0375	LS	UP	12500	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
GN0034	QU	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0104	QU	UP	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0105	QU	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0106	RN	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0146	UN	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0304	QU	UC	101175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0324	LS	UC	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0329	LS	HG	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0331	LS	HG	3600	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
GN0332	LS	HG	4800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0334	LS	HG	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0338	LS	HG	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0339	LS	HG	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0344	LS	HG	15000	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0345	LS	UC	48000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0346	QU	HG	90000	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
GN0348	LS	LW	3200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0349	LS	LW	25000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0350	LS	LW	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0351	LS	LW	30	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
GN0352	LS	LW	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0353	LS	LW	200000	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
GN0378	LS	UC	6400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0380	LS	HG	2100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0381	QU	HG	18750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0382	LS	HG	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN0383	LS	HG	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN1002	LS	LW	647520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GN1003	LS	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SITE TYPES: AL=ALIGNMENT, BK=BISON KILL, CN=CAIRN, CR=CEREMONIAL, HE=HEARTH, LS=LITHIC SCATTER, PC=ROCK ART, PT=PITS OR BLINDS, Q__=QUARRY(__=MATERIAL TYPE), RN=RING, RS=ROCKSHELTER, TR=TRAIL, UN=UNKNOWN, WK=WICKIUP.

LANDFORMS: BR=BREAKS, HG=HIGHLANDS, LW=LOWLANDS, UC=CREEKSIDE, UN=UNKNOWN, UP=UPLANDS.

MATERIAL TYPE: O=OBSIDIAN/IGNUMBRITE, C=CHERT/CHALCEDONY, B=BASALT, U=UNKNOWN.

DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
Site #	Site Type	Land-Frm	Site Area Sq. M.	E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
JF0068	CN	LW	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0108	LS	HG	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0139	LS	LW	90000	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
JF0173	LS	LW	5000	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
JF0177	CN	LW	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0232	LS	HG	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0233	LS	HG	7500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0234	LS	HG	12000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0235	RN	HG	6600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0236	RN	HG	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0237	LS	UC	8100	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
JF0238	LS	HG	30000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0239	LS	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0243	LS	UC	500	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
JF0267	LS	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0300	LS	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0467	LS	HG	93600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0471	LS	UC	1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0472	LS	UC	4800	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0
JF0487	UN	UP	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0492	LS	UC	15000	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
JF0493	LS	UC	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
JF0494	LS	UC	900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0498	QB	UC	200000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0499	LS	HG	750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0500	LS	UC	15000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0551	RN	UC	4000	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
JF0699	LS	LW	161880	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
JF0704	LS	LW	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0708	LS	UC	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0713	LS	UC	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0714	LS	UC	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0715	LS	UC	900	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
JF0717	LS	UC	10	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
JF0719	LS	UP	6400	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0
JF0720	QU	UP	9000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF0722	LS	UC	3000	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
JF1008	LS	LW	500	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
JF1013	LS	UC	500	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
JF1015	LS	UC	4047	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
JF1022	LS	UC	100000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF9901	PC	LW	4800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF9902	LS	LW	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JF9903	LS	LW	5000	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
JF9904	LS	LW	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
JF9905	LS	UC	100000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0125	LS	UP	7600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0173	AL	LW	11250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0179	RN	LW	5625	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0180	RN	UC	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0183	RN	UC	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0191	AL	LW	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0194	RN	LW	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0207	RN	UP	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0208	RN	UC	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0209	RN	UP	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0210	RN	LW	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
Site #	Site Type	Land-Frm	Site Area Sq. M.	E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
LC0613	RN	LW	363	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0614	RN	LW	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0615	LS	LW	6000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0667	LS	UC	10000	0	0	0	0	0	0	0	2	2	0	0	1	0	0	0
LC0668	LS	LW	1000	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
LC0669	LS	LW	1000	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
LC0675	LS	HG	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0677	CN	UP	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0678	RN	LW	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0679	LS	LW	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0680	CN	UC	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0699	RN	UC	450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC0707	RN	UP	2500	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0
LC0711	LS	HG	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC1001	RN	HG	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC1008	LS	UC	8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC1009	LS	UC	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC1010	LS	UC	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LC1037	RN	LW	250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0034	PC	HG	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0038	LS	UC	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0040	LS	UC	1000	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
MA0056	LS	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0059	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
MA0060	CN	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0061	QU	BR	20235	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
MA0062	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
MA0064	QU	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0065	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0070	LS	HG	1000	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0
MA0071	LS	HG	10	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
MA0072	CN	UC	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0077	LS	UC	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0078	LS	HG	100	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
MA0079	LS	UC	100	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
MA0080	RN	LW	647529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0081	WK	UC	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0082	RN	UC	80940	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MA0083	LS	UC	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0084	LS	UC	100	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
MA0085	LS	UC	100	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
MA0086	LS	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0121	QO	UC	510	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0149	QU	LW	80940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0150	LS	LW	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0152	AL	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0153	LS	LW	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0157	AL	HG	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0158	CN	UP	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0159	CN	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0162	LS	UC	100	0	0	0	0	0	1	0	0	1	1	0	3	0	3	0
MA0163	LS	UC	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0164	RN	HG	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0167	PT	UN	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0168	LS	HG	80940	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
MA0169	QU	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MA0170	LS	UP	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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DIAGNOSTICS FROM SITES

Site #	Site Type	Land-Frm	Site Area Sq. M.	# DIAGNOSTICS E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
MA0224	BK	LW	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0225	RN	LW	80000	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
MA0226	RN	LW	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0227	RN	LW	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0228	RN	LW	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0229	RN	LW	4800	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
MA0230	RN	LW	6250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0231	RN	LW	1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0232	LS	LW	25000	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
MA0233	LS	LW	15000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0234	LS	LW	7500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0235	LS	LW	7500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0236	LS	LW	3200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0237	LS	LW	3200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0238	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0239	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MA0240	RN	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0241	LS	UC	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0251	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0252	RN	LW	4047	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
MA0254	LS	LW	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0255	LS	LW	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
MA0266	CN	HG	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0268	CR	HG	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0271	LS	UC	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0272	AL	UP	8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0273	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0274	LS	HG	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0277	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0280	AL	HG	6400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0281	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0282	LS	HG	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0283	LS	HG	4047	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
MA0284	LS	HG	4047	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
MA0294	RN	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0304	UN	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0305	RS	LW	100	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MA0330	RN	HG	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0351	RN	LW	525	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0352	LS	LW	3000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0353	RN	LW	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0354	LS	LW	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0357	LS	LW	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0358	LS	UC	1400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0359	LS	UC	4800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0360	LS	HG	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0361	CN	HG	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0362	CR	HG	11400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0363	CR	HG	3000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0364	LS	UC	700	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0
MA0369	LS	UC	2960	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0370	LS	UC	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0372	LS	HG	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0375	LS	HG	2625	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0377	RN	LW	1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0378	LS	UC	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0380	LS	UC	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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DIAGNOSTICS FROM SITES

Site #	Site Type	Land-Frm	Site Area Sq. M.	# DIAGNOSTICS E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn-lea	Old-Wom	Pro-toh	Indeter	Cera-mic
MA0381	LS	UC	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0383	QO	HG	140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0384	LS	HG	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0385	QO	HG	2250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0387	BK	UC	6500	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
MA0388	LS	HG	161880	0	0	1	1	0	0	0	0	1	0	0	1	0	1	0
MA0389	RN	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MA0391	LS	UC	10	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
MA0394	CN	HG	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0395	LS	LW	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0396	LS	LW	5000	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
MA0397	RN	LW	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0398	RN	LW	825	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0399	RN	LW	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0401	LS	LW	150	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
MA0402	CN	LW	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0403	LS	LW	5000	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0
MA0404	LS	UP	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0405	QU	UP	4500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0406	QU	HG	12500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0407	LS	HG	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0551	RN	LW	41470	0	0	0	0	0	0	0	0	0	1	0	4	0	0	0
MA0552	LS	LW	58564	0	0	0	0	0	0	1	0	3	0	0	7	0	7	0
MA0556	RN	LW	60705	0	0	0	0	0	0	0	1	2	0	0	1	0	2	0
MA0557	LS	LW	20235	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0
MA0561	AL	UC	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0568	CR	UC	200	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
MA0601	WK	UC	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA0602	WK	UC	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA1003	PC	UC	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA1030	RN	HG	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA1041	BK	LW	40470	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
MA1042	BK	UC	200000	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0
MA1235	LS	HG	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
MA9901	LS	HG	9600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA9902	LS	HG	1500	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
MA9903	LS	HG	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA9904	LS	LW	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA9905	HE	UC	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MA9906	BK	UC	10000	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
ME0196	LS	LW	28329	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ME0197	RN	LW	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MO0165	LS	HG	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MO0166	LS	LW	40000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MO0167	LS	LW	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MO0168	LS	UC	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MO0170	QU	HG	8100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PA0176	CN	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PA0180	LS	HG	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PA0182	LS	UC	400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PA0341	LS	UC	300	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
PA0420	UN	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PA0652	LS	LW	80000	0	1	0	0	0	0	0	0	1	1	0	1	0	0	0
PW0091	LS	UC	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0092	LS	HG	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0093	LS	HG	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0094	TR	UC	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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DIAGNOSTICS FROM SITES

				# DIAGNOSTICS														
Site #	Site Type	Land- Frm	Site Area Sq. M.	E Paleo	M Paleo	L Paleo	Bitrt	Oxbow	Mkean	Hanna	Duncn	P Lake	Besant	Avn- lea	Old- Wom	Pro- toh	Indeter	Cera- mic
PW0099	LS	UN	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0100	LS	UN	12141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0102	LS	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0103	LS	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0113	QU	UC	5000	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0115	LS	UC	18000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0179	LS	UC	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0180	LS	HG	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0181	LS	HG	3200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0182	LS	HG	30000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0184	LS	HG	6750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0222	LS	UC	40000	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0
PW0223	LS	UC	1600	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
PW0226	LS	HG	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0232	LS	UC	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0239	LS	UC	4800	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
PW0244	LS	UC	6000	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
PW0245	LS	HG	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0246	LS	HG	100	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
PW0247	LS	UC	4250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW0248	LS	HG	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PW1006	LS	UN	20235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB0084	RS	UN	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB0168	AL	HG	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB0169	LS	HG	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB0170	LS	HG	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB0171	LS	UC	4047	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
SB0172	LS	UC	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB0173	CN	HG	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB0191	LS	UC	4047	0	0	1	0	0	1	0	2	1	0	0	0	0	0	0
SB0194	PT	UP	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB0198	LS	LW	240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB0200	LS	UC	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB1003	CR	HG	1942560	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
SB1009	RN	HG	647520	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SB9901	PT	LW	4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
TT0055	CR	HG	40470	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TT0056	LS	UP	120	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
TT0057	LS	UC	8094	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
TT0058	UN	LW	4047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TT0059	LS	LW	225	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TT0060	RN	UP	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TT0068	BK	LW	41800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TT0069	LS	UP	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TT0071	BK	LW	900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TT0072	BK	LW	1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TT0073	CR	HG	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TT0074	LS	UP	800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Appendix III. ANNOTATED BIBLIOGRAPHY OF SOURCES REVIEWED

Aaberg, Stephen A.

1981 Plant Gathering as a Settlement Determinant at the Pilgrim Stone Circle Site. Paper presented at the 1981 Annual Plains Conference.

Aaberg reviews the caloric efficiency of procuring plants and how they might relate to the aboriginal diet and hence influence siting decisions.

Allen, E.

1971 White-Tailed Deer. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 69-79. Montana Fish and Game Department, Helena.

Discusses white-tailed deer range, habits, and habitat in Montana. Discusses management, population levels, and harvest data.

Ames, Kenneth M., and Alan G. Marshall

1980 Villages, Demography and Subsistence Intensification on the Southern Columbia Plateau. *North American Archaeologist* 2(1):25-52.

The thesis of this article is that the intensification of plant exploitation was the critical subsistence change on the Southern Columbia Plateau that led to the establishment of semi-sedentary villages by 4,300 B.P.

Anastasio, Angelo

1972 The Southern Plateau: An Ecological Analysis of Intergroup Relations. *Northwest Anthropological Research Notes* 6(2):109-229.

A classic source on intergroup relationships in the Plateau. This work includes discussions of the scheduling decisions significant for subsistence made by various Plateau groups.

Anderson, Paul

1982 *Cultural Resources Inventory and Assessment Continental Line 100kv Row*. Report by Mineral Research Center to the Montana Power Company. On file at Butte District BLM.

Survey report for powerline project.

Antevs, Ernst

1955 Geologic-Climatic Dating in the West. *American Antiquity* 20:317-335.

Documents the occurrence of the Altithermal, and therefore forms the basis for the "mountains-as-refuge" hypothesis which is critical to understanding District archeology.

Arthur, George W.

1962 The Emigrant Bison Drives of Paradise Valley, Montana. *Montana Archaeological Society Memoir* No. 1:16-27.

Sites 24PA309, a combination jump and impoundment, and 24PA308 are described. 24PA309 was used both in the Middle and Late periods while 24PA309 was utilized apparently only during the Late period. None of the Middle period points were made of obsidian while the majority of the Late period points were.

1963 The Richardson Farm Site. *Archaeology in Montana* 5(3):19-22.

This brief article describes a multi-component site found in a plowed field about 12.4 km downstream from Missoula. Artifacts from the site include projectile points, pestles, and grooved mauls in addition to flakes. The only feature type noted was hearths.

1966 An Archeological Survey of the Upper Yellowstone River Drainage, Montana. *Agricultural Economics Research Report* No. 26. Department of Agricultural Economics and Rural Sociology, Montana Agricultural Experiment Station, Bozeman.

Arthur describes 47 sites (PA 301-334; SW 201-210; GA 305-307) which document intermittent occupation of the Upper Yellowstone throughout the Early period and with continuous occupation during the Middle and Late periods.

1967 The Whetstone Ridge Site (24ME409). *Archaeology in Montana* 8(3):16-25.

Site 24ME409 is located in the Castle Mountains and contains two conical timbered lodges.

1968 Southern Montana. In *The Northwestern Plains: A Symposium*, edited by W. W. Caldwell and S. W. Conner, pp. 51-62. Rocky Mountain College Center for Indian Studies, Billings.

Arthur follows Swanson (1966) and proposes a seasonal transhumance model utilizing different elevations seasonally.

Baker, F. S.

1944 Mountain Climates of the Western United States. *Ecological Monographs* 14(2):225-254.

Provides a detailed description of the factors that affect localized weather patterns throughout the Rocky Mountains and other coastal ranges. Also provides details of weather data (temperatures, precipitation, growing season, and snowfall) for particular regions and seasonal patterns of weather at different elevations.

Baker, R. G.

1976 Late Quaternary Vegetation History of the Yellowstone Lake Basin, Wyoming. *U.S. Geological Survey, Professional Papers* 729-E.

Describes climatic and vegetation change in the Yellowstone Park region as derived from pollen core studies.

Barrett, Stephen W.

1981 Relationship of Indian-Caused Fires to the Ecology of Western Montana Forests. *USDA-FS Northern Region Report* No. 4.

This thesis documents the use of fire by historic groups to aid hunting, food plant production, and forage for horses.

Binford, Lewis R.

1980 Willow Smoke and Dog's Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45:4-20.

This article is the basis of an ethnographic analogy often used to explain intersite variability.

Binford, Lewis R., and Jeremy A. Sabloff

1982 Paradigms, Systematics and Archaeology. *Journal of Anthropological Research* 38(2):137-153.

Compares and contrasts the world views of Old World and New World archaeologists.

Blankinship, J. W.

1905 Native Economic Plants of Montana. *Montana Agricultural College Experiment Station Bulletin* No. 56. Bozeman.

The major ethnobotany listing plant utilization for the entire State, but particularly useful for western Montana. Most exhaustive source for plant utilization, but does employ accounts of plant use from distant locations outside Montana and suffers from outdated scientific nomenclature.

Bliss, W. L.

1947 Preliminary Appraisal of the Archaeological and Paleontological Resources of Tiber Reservoir, Toole and Liberty Counties, Montana. Smithsonian Institution River Basin Survey—Missouri Basin Project—Appraisal. On file, Midwest Archeological Center, National Park Service, Lincoln.

Contains brief site descriptions only, with no analysis.

Boas, Franz

1890 The Indians of British Columbia: Tlingit, Haida, Tsimshian, Kutonaqa. *Report of the British Association for the Advancement of Science*, pp. 797-893.

Boas describes the burial practices of the Kutenai, which has archeological significance for the interpretation of scarred trees.

1918 Kutenai Tales. *Smithsonian Institution, Bureau of American Ethnology Bulletin* 59.

Includes botanical listing of plants utilized and documents the basic distinction made in rock types which Boas translates as flint vs. diorite.

Bonnichsen, Robson, and S. J. Baldwin

1977 Ethnohistory and Ecology of the Cypress Hills in Regional Perspective, *Archaeological Survey of Alberta, Occasional Paper*. Edmonton.

This is a review of the use of mountain habitats from a Plains perspective.

Booth, W. E.

1972 *Grasses of Montana*. Montana State University, Bozeman.

Is the primary key, guide, and description of grasses in Montana.

Booth, W. E., and J. C. Wright

1959 *Flora of Montana, Part II*. Montana State University, Bozeman.

Is the primary key, guide, and description of dicotyledons of Montana and contains general habitat and distribution data.

Borchert, J. R.

1950 The Climate of the Central North American Grasslands. *Annals of the Association of American Geographers* 40(1):1-39.

Discusses the major climate patterns of the Great Plains and the seasonal dominance patterns of the main air masses. Most applicable to those portions of the District east of the Continental Divide.

Borden, Charles E.

1956 Two Surveys in the East Kutenai Region. *Research Studies of the State College of Washington* 24:1. Pullman.

Borden associated the Kutenai with expanding stem projectile point types. These points may be unnotched, corner-notched, or barbed. Ethnic affiliation is based on a perceived geographic and functional correlation.

Brown, C. J. D.

1971 Fishes of Montana. Big Sky Books, Bozeman.

Describes all fishes native to Montana and recently introduced taxa. Contains information on habits, size, and distribution of all taxa.

Brown R. L.

1971 Sharp-Tailed Grouse. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 129-133. Montana Fish and Game Department, Helena.

Discusses sharp-tailed grouse ecology and distribution in Montana. Is pertinent to only the southern and eastern portions of the Butte District.

Brumley, John

1974 Report on a Test Excavation at the Desrosier Site (24ME1002). *Archaeology in Montana* 15(3):1-21.

Describes test excavations in a rockshelter in Meagher County. Site had faint pictographs and buried strata producing bone, many flakes (mostly a local brown chert), points, bifaces, gravers, modified flakes, and a grinding slab. Points indicate occupation in McKean, Yonkee, Hanna, Old Women's, and perhaps Bitterroot times.

Bryson, Reid A., David A. Baerreis, and Wayne M. Wendland

1970 The Character of Late-Glacial and Post-Glacial Climate Change. In *Pleistocene and Recent Environments of the Central Great Plains*, edited by Wakefield Dort, Jr. and J. Knox Jones, Jr., pp. 53-74. The University Press of Kansas, Lawrence.

Characterizes environmental periods of the post-glacial period using European terminology and describes the climatic shifts that produced the different environmental conditions. Generally applicable to the Northwestern Plains and the Butte District.

Bureau of Land Management

1977-1982 *Cultural Resource Inventory Reports FY77, FY78, FY79, FY80, FY81, FY82.* Forms on file at Butte District BLM Office.

Descriptions of survey plots, methods, and findings for all surveys.

1982?? *Cultural Resource Inventory of the Bear Trap Canyon Primitive and Recreation Areas.* Ms. on file at the Bureau of Land Management, Butte District Office.

Summary of cultural resources and management concerns for Bear Trap Canyon area.

1983 *Cultural Resource Investigations for the Public Land Adjustment Program within the Dillon Resource Area.* Ms. on file at the Bureau of Land Management, Butte District Office.

Summary of cultural resource survey of scattered BLM lands in Dillon Resource Area.

Burt, William H., and Richard P. Grossenheider

1976 *Field Guide to the Mammals.* Houghton-Mifflin, New York.

This is a general field text (part of the Peterson Field Guide Series).

Bussey, B. Jean

1981 Archaeological Investigations Along the Pend D'Oreille River of South-Central British Columbia, *Occasional Papers of the Heritage Conservation Branch* No. 7. Province of British Columbia.

Description and analysis of materials from DgQi3 and DgQi3. These sites are thought to have Interior Plateau, Columbia Plateau, or East Kootenay affinities.

Butler, B. Robert

1981 When Did the Shoshoni Begin to Occupy Southern Idaho?: Essays on Late Prehistoric Cultural Remains from the Upper Snake and Salmon River Country. *Occasional Papers of the Idaho Museum of Natural History* No. 32. Pocatello.

This work contains two essays by Butler in which he presents evidence to indicate that the Shoshone may have not reached Idaho until the 1700s. This interpretation has several implications for the use of models derived from the Shoshone.

Cade, Leland (Mrs.)

1956 *The Buffalo Kill Near Highwood Montana.* Ms. (Special Collections—Montana State University Library).

An amateur's informal description of the Highwood buffalo jump.

Carlson, L. G., and M. A. Loschieder

1977 An Archaeological and Ethnohistorical Investigation of Selected areas in Kootenai National Forest, Northwestern Montana. *Plains Anthropologist* 22(75):59-66.

This report emphasizes a relatively high site density along Kootenai River terraces.

Chalfant, Stuart A.

1974a Aboriginal Territories of the Flathead, Pend D'Oreille and Kutenai Indians of Western Montana (No. 61, Def. Ex. 24). In *Interior Salish and Eastern Washington Indians II*, edited by S. A. Chalfant, C. Malouf, and M. G. Burlingame, pp. 25-115. Garland, New York.

This resource presents critical information about the subsistence round of tribes utilizing western Montana. It is a particularly important resource because it relies heavily on Claude Schaeffer's 10 volumes of unpublished field notes.

1974b Aboriginal Territory of the Kalispel Indians. In *Interior Salish and Eastern Washington Indians, III*, edited by D. H. Horr, pp. 169-232. Garland, New York.

This paper presents detailed data about the subsistence round and land-use patterns of the Kutenai. It also summarizes the ethnologically relevant passages of Suckley, Geo D. in Reports of Explorations and Surveys to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean. Vol. 1, WA, 1855.

Chalfant, Stuart A., C. Malouf, and M. G. Burlingame

1974 *Interior Salish and Eastern Washington Indians II*. Garland, New York.

This is a compilation of Indian Land Claims testimony. The introduction summarizes the tribal distribution of the Plateau groups.

Chamberlain, Alexander F.

1892 Report on the Kootenai Indians. *Report of the British Association for the Advancement of Science* 63:549-617.

Describes clothing, pipes, arrows, and fish hooks used by the Kutenai.

1902 Geographic Terms of Kootenay Origin. *American Anthropologist* 4:348-350.

None of the place names refer to activities at the localities.

Chance, David

1981 *The Kootenay Fur Trade and Its Establishments*. Technical report to the U.S. Army Corps of Engineers, Seattle.

This is a critical resource for Kutenai ethnohistory.

Chelini, J. M.

1965 Limestone, Dolomite, and Travertine in Montana. *Montana Bureau of Mines and Geology Bulletin* 44. Butte.

Describes the major limestone formations of Montana, including petrology, distribution, and use. Is most valuable to archeologists as a discussion of the distribution of formations that often contain workable chert.

Choquette, W., and C. Holstine

1981 An Archaeological and Historical Overview of the Bonneville Power Administration's Proposed Garrison-Spokane Transmission Line Corridor, Western Montana, Northern Idaho, and Eastern Washington. *Eastern Washington University Reports in Archaeology and History* 100-20.

This report is a literature/archival review of the area outlined in the title in preparation for an EIS.

Chrest, H.

1971 White-Tailed Ptarmigan. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 181-183. Montana Fish and Game Department, Helena.

Briefly describes ptarmigan habits, habitat, and distribution in Montana. Is pertinent to only a few high-altitude locations in the Butte District.

Collins, Mary, and R. S. Timmons

1981 A *Cultural Resource Inventory of the Proposed Yaak Highway Improvement Project*. A Report to the Federal Highway Administration by the Kootenai National Forest.

Limited information, but one of the few sources on the Yaak area. Describes the amateur collection of projectile points from the area.

Compton, H., J. Egan, and R. Trueblood

1971 Pronghorn Antelope. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 81-87. Montana Fish Game Department, Helena.

Discusses pronghorn ecology in Montana and describes past and present distribution, management, and harvest levels.

Coues, Elliot (editor)

1892 *Manuscript Journals of Alexander Henry and David Thompson* (3 Vols.) New York.

The journals contain brief descriptions of groups relevant to the study area. It is most relevant to the Post-horse period and the northern half of the area. Volume 3 contains useful maps and a detailed index.

1965 *History of the Expedition Under the Command of Lewis & Clark*, Vol. 1-3. Dover, New York.

The journals contain references to both Plains and Plateau groups relevant to the area. It is most relevant to the Post-horse period.

Coupland, Robert T.

1958 The Effects of Fluctuations in Weather Upon the Grasslands of the Great Plains. *Botanical Review* 24:274-317.

Describes and quantifies increased and decreased forage productivity and coverage under variable weather conditions of the twentieth century. Demonstrates the extent of carrying capacity changes during a single climatic episode.

Darroch, John I.

1974 Edge-Ground Cobbles: A Discussion. *Archaeology in Montana* 15(2):52-73.

Describes edge-ground cobbles, their distribution, and possible functions. There may be two types based on morphology. The battered variety may have been used in striking-off blades, while the polished type was probably a product of grinding plant foods or processing hides.

Daubenmire, Rexford

1969 Structure and Ecology of Coniferous Forests of the Northern Rocky Mountains. In *Coniferous Forests of the Northern Rocky Mountains*, edited by Richard D. Taber, pp. 25-41. Center for Natural Resources, University of Montana Foundation, Missoula.

Describes major habitat types of Montane Taiga, Temperate Mesophytic Forests, and Xerophytic Forests of northern Idaho, eastern Washington, and western Montana.

Daubenmire, R., and Joan B. Daubenmire

1968 Forest Vegetation of Eastern Washington and Northern Idaho. *Washington Agricultural Experiment Station Technical Bulletin* 60. Washington State University, Pullman.

Describes and discusses habitat types of forested areas on subject location. Many of the habitat types are directly applicable to portions of the Butte District with a Pacific Climate, particularly the northwestern part.

Davis, Carl M.

1975 Wickiup Cave. *Plains Anthropologist* 20(70):297-305.

Site 24BE601, located in the Tendoy Mountains, is described. The wickiup and the associated artifacts are attributed to historic Tukudika Shoshone occupation.

Davis, Carl M., and Edrie L. Vinson

1980 The Kootenai Falls Portage Trail. *Archaeology in Montana* 21(3):129-147.

Describes Kootenai Falls Portage Trail which connects Upper Columbia and Missouri River Basins. Trail was used in prehistoric and historic times. A segment of the Trail near the portage is still visible and is near large cairns and two occupation sites.

Davis, Emma Lou

1963 The Desert Culture of the Western Great Basin: A Lifeway of Seasonal Transhumance. *American Antiquity* 29:202-212.

This article carefully documents the effect of seasonality on material culture remains: grinding implements are associated with summer sites. Incidentally, the illustrated projectile points demonstrate that classic Plains types are found in the Basin.

Davis, Leslie B.

1966 Avonlea Point Occurrence in Northern Montana and Canada. *Plains Anthropologist* 11(32):100-116.

This article discusses the distribution of and quantitative measures used to define the Avonlea point type. Sites discussed include 24BL101, 24BL104, 24CA452, and 24TL22.

1972 *The Prehistoric Use of Obsidian in the Northwestern Plains*. Unpublished Ph.D. dissertation, University of Calgary, Calgary, Alberta.

Obsidian use in the southern Montana area across prehistoric periods are Early period 11.19%, Middle period 64.42%, and Late period 24.93%. Pelican Lake peoples exhibit the greatest intensity of obsidian use.

1975 A Hydration Dated Obsidian Corner-Tang Knife, East Gallatin Valley, Montana. *Archaeology in Montana* 16(3):121-135.

Describes characteristics and geographic distribution of the corner-tang knife. Artifact type most common in Texas, but occurs in Montana mostly in mountain-foothill settings. A date of 250 B.C. is suggested. Possible means of hafting are discussed.

1980 In Quest of the "Old Cherry Creek Indian Trail". *Archaeology in Montana* 21(3):149-177.

Describes an attempt to document the location, and indeed reality, of a trail said to connect the Madison River at Ennis Lake to the Gallatin River valley. The trail is reported by local residents, but only a few historic accounts mention its existence and the route is not clear. There is minimal on-the-ground surface evidence of this trail.

1981 *Cattleguard No. 3: Intensive Small-Scale Mitigation Excavations at the South Everson Creek Chert Quarry/Workshop Site (24BE559) in Southwestern Montana*. Report by the author for the Bureau of Land Management, Butte District.

Important description of a small excavation in a very large chert quarry near Dillon. Site produced very large assemblage from several distinct occupations. Problems with chert source characterizations are discussed.

1982 Montana Archaeology and Radiocarbon Dates: 1962-1981. *Archaeology in Montana, Special Issue* No. 3.

Lists all Montana radiocarbon samples dated through 1981. Dates are listed by county and include coded data on site type, provenience, cultural affiliation, material type dated, lab number, donor, and corrected dates. Lists 106 dates in Butte District from 38 sites in 10 counties.

Davis, Leslie B., Stephen A. Aaberg, and John W. Fisher

1980 *Cultural Resources in the Limestone Hills Army National Guard Training Site, Broadwater County, Montana*. Report prepared by Montana State University for the Montana Army National Guard, Helena.

Describes a survey of 23,930 acres southwest of Townsend that located 87 sites. Sixteen are historic. Of the prehistoric sites, open air lithic scatters are the most common, followed by tipi ring, cairn, quarry, and game drive sites. Sites and isolated finds produced points from the Early Prehistoric period, Mummy Cave complex, Oxbow complex, Pelican Lake phase, Besant phase, Old Women's phase, and Protohistoric period.

Davis, Leslie B., Stephen A. Aaberg, Michael Wilson, and Robert Ottersberg

1982 *Stone Circles in the Montana Rockies: Systematic Recovery and Culture-Ecological Inference*. Report by Montana State University to the Montana Army National Guard, Helena.

Important report describing a new approach to excavating tipi rings and analysis of project data, including available plant resources and caloric efficiency of plant utilization. Work took place at the Pilgrim site in Broadwater County.

Davis, Leslie B., and Charles D. Zeier

1978 Multi-Phase Late Period Bison Procurement at the Antonsen Site, Southwestern Montana. *Plains Anthropologist, Memoir* 14:222-235.

Site 24GA660 (Malouf's MSC #6; Napton's 24GA311). Davis and Zeier documented use of the site from Pelican Lake times through Old Women's. Obsidian was utilized much more often in the Old Women's phase than the Besant. Knife River Flint occurs in small quantities in the Besant assemblage.

Davis, Leslie B., and Troy Helmick

1982 Inundated Prehistoric Occupation Sites Along Canyon Ferry Lake. *Archaeology in Montana* 23(3):41-84.

Describes surface material collected over a 15-year period from 10 localities which are below normal water level of Canyon Ferry Reservoir (southern end). A few manos and metates are reported from Localities II, III, and IV. Analysis conducted on 1,085 projectile points (657 of which could not be typed) indicates all phases from Paleoindian through Protohistoric are present and all localities have multiple point types. Overall, Pelican Lake points are the most common (53% of identifiable), followed by Bitterroot (19%) and Hanna (11%). Some non-Plains (Plateau) attributes are noted in the points. Using frequency and presence/absence analysis a direct relationship between Bitterroot and Oxbow occupations is indicated. Similar but weaker relationships are noted for McKean-Powers Yonkee, Hanna-Pelican Lake, and Avonlea-Late Plains. In each case, the earlier phase is suggested as ancestral to the latter based on Canyon Ferry data.

Davis, Leslie B., Donald L. Smith, Larry C. Munn, Gerald A. Nielson, Michael Wilson, and Thomas A. Foor
1978 The Schmitt Chert Mine Investigations 1972-1978. Papers presented at the 1978 Plains Conference, Denver, Colorado.

The presentation was mainly descriptive, emphasizing the vast amount and variety of material recovered.

Deaver, Ken
1983a Subsistence Strategy Within the Study Area. In *Archaeological Investigations on the Northern Border Pipeline Montana Segment, Vol. 3*, edited by Ken Deaver, pp. 7.1-7.47. Report by Professional Analysts to the Northern Plains Natural Gas Company, Omaha.

Describes prehistoric subsistence strategy in northeastern Montana. Is pertinent to the Butte District only as a comparison in resources in the prairie regions.

Deaver, Ken (editor)
1983b *Site Distribution and Lithic Resource Utilization in the Powder River Resource Area, Southeastern Montana*. Report prepared by Professional Analysts for BLM-Miles City District.

This resource is relevant to this project only in providing comparative site densities from other areas in Montana.

Deaver, Sherri
1983 Tipis: Distribution and Significance. In *Archaeological Investigations on the Northern Border Pipeline, Montana Segment, Vol. 3*, edited by Ken Deaver, pp. 9.1-9.43. Report by Professional Analysts submitted to Northern Plains Gas Company, Omaha.

This chapter charts a specific mathematical model for deriving population figures, housing weights, and the number of dogs and/or number of horses from tipi rings.

Des Rosier, Fred L.
1963 Kutenai War Lodges? *Archaeology in Montana* 6(1):14-15.

This article briefly describes and illustrates some fragmentary remains of possible timbered lodges in the St. Marys Lake area.

Dimon, Stacy
1978 *Deep Creek Timber Compartment Development Plan: Inventory of Historic Sites*. Report on file at Butte District, Bureau of Land Management.

Description of historic sites in Deep Creek area.

Dort, Wakefield, Jr.
1962 Multiple Glaciation of Southern Lemhi Mountains, Idaho—Preliminary Reconnaissance Report. *Tebiwa* 5(2):2-17. Pocatello.

Describes evidence for major and minor glacial advances in Lemhi Mountains. Is generally pertinent to conditions in mountains of parts of Butte District.

Doxiadus, C. A.
1976 *Action For Human Settlements*. Norton, New York.

The ekistics school of architectural planning has calculated the minimal housing person bubble as 4.08 sq.m. This can be applied to estimate populations of archeological sites when the floor area of habitation structures is known. The various ramifications and applications of this model to tipis have been discussed in detail by S. Deaver (1983).

Dunnell, Robert C.

1982 Science, Social Science and Common Sense: The Agonizing Dilemma of Modern Archaeology. *Journal of Anthropological Research* 38(1):1-25.

Thesis of the article is that archeology is not a science because of its lack of theory.

Dyck, Ian

1983 The Prehistory of Southern Saskatchewan. *Tracking Ancient Hunters, Prehistoric Archaeology in Saskatchewan*, edited by Henry T. Epp and Ian Dyck, pp. 63-140. Saskatchewan Archaeological Society, Regina.

Contains a complete summary and synthesis of prehistoric adaptations to environmental conditions. Also contains good artifact illustrations and revision of some Northwestern Plains phases and periods.

Ebert, James I.

1979 An Ethnoarchaeological Approach To Reassessing the Meaning of Variability in Stone Tool Assemblages. In *Ethnoarchaeology*, edited by Carol Kramer, pp. 21-58. Columbia University Press, New York.

This article proposes an approach to lithics which avoids the sampling paradox. The analytical strategy is based on two variables: the size of the lithic item and the amount of energy involved in creating the form.

Egan, J.

1971 Mule Deer. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 53-67. Montana Fish and Game Department, Helena.

Discusses mule deer ecology, range, habits, and habitats. Traces the types of past management and population and distribution changes.

Ellison, Lincoln, and E. J. Woolfolk

1937 Effects of Drought on Vegetation Near Miles City, Montana. *Ecology* 18:329-336.

Quantifies the reduction in forage yields and hence ungulate carrying capacity during the Dustbowl Era. Applicable generally to the prairie portions of the Butte District.

Ewers, John C.

1944a *The Story of the Blackfeet Indian Life and Customs Pamphlet—6*. Education Division, U.S. Indian Service.

This book is intended for the general public and contains little detailed information applicable to the prehistoric era. It does include one photograph, page 20, of the "stone arrowheads from Blackfeet Reservation buffalo drives." Ewers attributed them to the period when this was Shoshone country. Three appear to be Late period side-notched, while one may be Middle period.

1944b The Blackfoot War Lodge: Its Construction and Use. *American Anthropologist* 46(1):182-192.

In addition to describing this variant habitation structure in detail, this article presents an argument for timbered areas being critical resources for plainsmen.

1945 The Case for Blackfoot Pottery. *American Anthropologist* 47:2.

This article details the evidence on Blackfoot pottery and describes the ware.

1955 The Horse in Blackfoot Indian Culture With Comparative Material From Other Western Tribes. *Bureau of American Ethnology Bulletin* 159. Washington, D.C.

Almost the entire text concentrates on the horse period. Ewers maintains that the Blackfoot had obtained both the horse and gun before they moved into the Butte District area.

1958 *The Blackfeet, Raiders of the Northwestern Plains*. University of Oklahoma Press, Norman.

This basic standard work contains detailed information about habitation structures, seasonal round, and various items of material culture.

1967 Was There a Northwestern Plains Sub-Culture? *Plains Anthropologist* 12(36):167-174.

Ewers found no justification on the basis of historic tribes for regarding the Northwestern Plains as a distinct subdivision of the Plains Culture Area.

Eyman, Frances

1968 The Teshoa, A Shoshonean Woman's Knife: A Study of American Indian Chopper Industries. *Pennsylvania Archaeologist* 34(3-4):9-52.

This article surveys the distribution of cobble-based lithic industry, postulating that it post-dates the Paleoindian bifacial technology and was ultimately derived from Siberia. Teshoa are large cortical flakes used in hide and meat processing. Their use in the Butte District has been recorded by Wissler (1910) and Spinden (1908).

Fenenga, F., and P. L. Cooper

1951a *Appraisal of the Archaeological and Paleontological Resources of the Sun River Basin, Montana*. Missouri River Basin Survey. Ms. on file at Midwest Archeological Center, National Park Service.

Sites 24LC31 and 24LC32 are briefly described as are 24TTl, 24TT2, and 24TT3.

1951b *Appraisal of the Archaeological and Paleontological Resources of the Jefferson River Basin, Montana*. Missouri River Basin Survey. Ms. on file at Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

This report describes the following sites: 24BE14, BE15, BE16, BE17, BE18, BE10, BE11, BE12, BE13, BE1, BE2, BE3, and BE4.

Fitting, James E.

1973 History and Crisis in Archaeology. In *The Development of North American Archaeology*, edited by James E. Fitting, pp. 1-13. Anchor Books, New York.

A reworking of Kuhn's thesis on the structure of scientific change and how it applies to archeology.

Flint, Patricia R.

1980 Excavations at the Graybeal Site, 1979: A Preliminary Report. *Archaeology in Montana* 21(1):33-44.

Describes materials recovered from excavations of the Graybeal site, including 13 points (5 diagnostic), flakes, bone, shell, and FCR. Points indicate occupation during Hanna, Pelican Lake, Besant, and Old Women's phases, although Basin and Plateau influences are noted for some points. Flakes are described as to material type, size, and amount of cortex. Site interpreted as a winter occupation.

1982 *The Northern Rocky Mountain Region Environment and Culture History*. Unpublished Ph.D. dissertation, University of Oregon, Eugene.

Presents environmental and cultural data in support of the thesis that the mountainous areas of western Montana and northern Idaho are a unique cultural region, not part of the Northwestern Plains, Interior Plateau, or Great Basin Culture Areas. Describes a survey in the Flint Creek Range and excavations at the Graybeal site.

Flint, Patricia R., and Robert Lee Sappington

1982 Geological Sources of Archaeological Obsidian in the Flint Creek Valley Area, Northern Rocky Mountain Region. *Archaeology in Montana* 23(1):19-26.

Twenty-two obsidian samples from sites in Granite County, Montana were subjected to x-ray fluorescence analysis to determine the natural source of the material. Thirteen samples were typed reliably and six indicate sources in northwestern Wyoming. The other seven samples originate from various sources in southern Idaho and eastern Oregon. No samples were typed from the closer Montana sources. An obsidian Hanna point derives from an Oregon source and indicates considerable antiquity for the trading of distant-source obsidian.

Foor, Thomas A.

1982 *Cultural Continuity of the Northwestern Great Plains—1300 B.C. to A. D. 200, the Pelican Lake Culture*. Unpublished Ph.D. dissertation, University of California, Santa Barbara.

Foor accepts Schroedl's (1973) thesis that the occurrence of corner-notched projectile points in the transmontane is associated with post-Altithermal reappearance of bison in the Plateau.

Forbis, R. G.

1955 *The MacHaffie Site*. Unpublished Ph.D. dissertation, Columbia University, New York.

The MacHaffie site is a presumed lithic workshop and campsite on the extreme western edge of the Montana Great Plains. It is a multi-component site, with Folsom represented. MacHaffie II is usually labeled Scottsbluff since it includes thin, short, and medium length projectile points, most of which exhibit parallel-collateral flaking.

Forbis, Richard G., and John D. Sperry

1952 An Early Man Site in Montana. *American Antiquity* 18:127-133.

This article reports the original excavations at the MacHaffie site.

Foss, A., and M. Rognrud

1971 Rocky Mountain Goat. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 107-113. Montana Fish and Game Department, Helena.

Discusses mountain goat habitat and habits, past and present distribution, and management approaches.

Fredlund, Dale E.

1970 An Extension of Avonlea Distribution. *Archaeology in Montana* 11(4):71-72.

Mentions and pictures Avonlea points found in sites west of the Continental Divide at the McDonald Lake site and from the Clark Fork River near St. Regis.

Fredlund, Dale E., and Lynn Fredlund

1970 Archaeological Survey of the Forks of the Flathead River: A Preliminary Report. *Archaeology in Montana* 11(4):15-29.

Describes a survey of the Flathead River valley in Flathead and Powell Counties. A total of 23 sites are described, mostly small, diffuse lithic scatters and several aboriginal trail fragments.

1971 Archaeological Survey of the Three Forks of the Flathead River, Montana. *Archaeology in Montana* 12(2&3):1-58.

Three hundred and five kilometers of river frontage were surveyed and 26 sites recorded. Conclusions emphasize the high ecological diversity of mountainous areas and, in general, support Swanson's notion of core area. A seasonal transhumance model is hypothesized. Ground stone tools are reported at two sites.

Fredlund, Lynn B.

1982 *Cultural Resource Inventory and Assessment of Seismic Lines in Beaverhead County, MT*. Report by Mineral Research Center for Seiscom Data Inc. On file at Butte District, Bureau of Land Management.

Brief survey report for seismic project.

Frison, George C.

1973 The Plains. In *The Development of North American Archaeology*, edited by James E. Fitting, pp. 151-184. Anchor Books.

Informative survey of the historical development of Plains archeology noting the significance of Paleoindian studies, River Basin archeology and the growth of the Plains Anthropological Society.

1978 *Prehistoric Hunters of the High Plains*. Academic Press, New York.

This is a basic reference for the cultural chronology of the area.

Fuller, E. O.

1974 The Confederated Salish and Kutenai Tribes of the Flathead Reservation. In *Interior Salish and Eastern Washington Indians III*, edited by D. G. Horr, pp. 27-168. Garland, New York.

Relies primarily on Teit and Turney-High for the sections on pre-horse times. Contains good maps and an excellent set of appendices which summarize ethnohistoric source materials.

Galm, Jerry R., Glenn D. Hartmann, and Craig Holstine

1982 *A Cultural Resource Survey of Portions of Montana Power Company's Sheridan-Ennis 161KV Transmission Line, Madison County, Montana*. Report by Archaeological and Historical Services of Eastern Washington University for Montana Power Company. On file Butte District, Bureau of Land Management.

Survey report for transmission line project.

Geertz, Clifford

1964 Ideology as a cultural system. In *Ideology and Discontent*, edited by David E. Apter, pp. 47-75. Free Press, New York.

This work is relevant to this project only insofar as it details Geertz's notion of cultural systems.

GCM Services, Inc.

1983 *Cultural Resources Literature Search For West Line Replacement/North*. Report by GCM Services for Montana Power Company. On file at Butte District, Bureau of Land Management.

Cultural resource report for proposed powerline project.

Gill, J. R., and W. A. Cobban

1973 Stratigraphy and Geologic History of the Montana Group and Equivalent Rocks, Montana, Wyoming, and North and South Dakota. *U.S. Geological Survey Professional Paper* 776. Washington, D.C.

Describes the formation, characteristics, and distribution of Cretaceous sedimentary strata. Is most pertinent to the eastern portion of the Butte District.

Gilmore, Harry C.

1953 Hunting Habits of the Early Nevada Paiutes. *American Anthropologist* 55:1.

This article describes game traps among the Shoshone.

Gilmore, Melvin R.

1977 (1919) *Uses of Plants By the Indians of the Missouri River Region*. University of Nebraska Press, Lincoln.

Is an ethnobotany for Indians of the Northern Plains. Describes plants used as food, seasoning and medicine, and for other purposes. Is only marginally pertinent to the Butte District because most descriptions are for the Middle Missouri Region.

Gould, R. A.

1980 Beyond Analogy in Ethnoarchaeology. In *Explorations in Ethnoarchaeology*, edited by R. A. Gould, pp. 249-329. University of New Mexico Press, Albuquerque.

The thesis of this article is that archeologists should not only use ethnographic information to search for analogues, but also to formulate models. Noting the differences between the model and the archeological patterning of material culture and attempting to explain these differences in a systematic fashion is called the contrastive approach.

Greaves, Sheila

1982 Upon the Point: A Preliminary Investigation of Ethnicity as a Source of Metric Variation in Lithic Projectile Points. *Archaeological Survey of Canada* No. 109. Ottawa.

This study tests 24 discrete variables in Late Plains side-notched points.

Green, James P.

1973 McKean and Little Lake Technology: A Problem in Projectile Point Typology in the Great Basin of North America. In *Selected Papers on Lithic Technology from the IXth International Congress of Anthropological and Ethnological Sciences*, edited by E. N. Swanson, Jr. Mouton Publishers, The Netherlands.

Comparison of two morphologically similar point types in the Great Basin.

Grinnell, George B.

1923 *The Cheyenne Indians: Their History and Ways of Life*. University of Nebraska Press, Lincoln.

This two-volume work is one of the basic ethnographic references on the Cheyenne. Volume 1 covers material culture and subsistence.

1962 *Blackfoot Lodge Tales*. University of Nebraska Press, Lincoln.

This book contains one chapter describing the material culture and subsistence activities of the Blackfoot.

Griswold, Gillette G.

1954 *Aboriginal Patterns of Trade Between the Columbia Basin and the Plains*. M.A. thesis, Montana State University (University of Montana), Missoula. (Published in *Archaeology in Montana* 11(2&3), 1970).

Most of the data presented are from historic sources and, although trade relationships no doubt existed at some scale in the prehistoric period, no pattern is definitely demonstrated.

Griswold, Gillette (editor)

1953 Archaeological Sites in the Flathead Lake Region, Montana: A Symposium. *Anthropology and Sociology Papers* No. 15. Montana State University, Missoula.

This paper presents the description of nine sites, 24LA1, LA2, LA3, LA4, FH2, FH1, FH3, and LA6. Typically, these sites are located at the mouths of streams and lake shore areas. Six sites are lithic scatters, one a rockshelter, and two are pictograph panels. Ground stone tools as well as flaked tools are noted.

Griswold, Gillette, and D. W. Larom

1954 The Hellgate Survey. *Anthropology and Sociology Papers* No. 16. Montana State University, Missoula.

The following sites are described: 24M011, M010, M012, M013, GN1, GN2, GN3, GN4, and GN5. Thirty-one likely localities were checked. When bluff/tablelands were available, sites tended to be located on them. Grooved mauls, projectile points of the Middle and Late periods, and historic trade goods are described.

Hahn, Barton E.

1973 *Flora of Montana: Conifers and Monocots*. Montana State University, Bozeman.

Is the primary key, guide, and description for conifers and monocots in Montana. This volume is a revision of Booth's Volume 1 of *Flora of Montana*.

Hart, Jeff

1976 *Montana—Native Plants and Early Peoples*. Montana Historical Society, Helena.

Is a brief secondary ethnobotany for the entire State. Is not exhaustive, but does offer a number of detais for utilization of particular edible taxa.

Hayden, Brian

1981 Research and Development in the Stone Age: Technological Transitions Among Hunters and Gatherers with *CA* comment. *Current Anthropology* 22(5):519-549.

This article covers the Mesolithic/Archaic worldwide. The basic thesis presented is that resource stress results in one of two possible strategies to increase resource reliability: (1) increase the diversity of resources exploited or (2) increase the efficiency of getting a relatively abundant resource.

Hedges, E. A., and G. Cram
1974 Assessment of Sex, Age, Race and Pathology of a Human Skeleton Unearthed at Garrison, Montana. *University of Montana, Contributions to Anthropology* No. 4:113-122.

This article is a description of one skeleton with no special features.

Hellson, John C., and Morgan Gadd
1974 Ethnobotany of the Blackfoot Indians. *Canadian Ethnology Service Paper* No. 19. National Museum of Canada, Ottawa.

Over 100 plants are described in topical form: religion and ceremony, birth control, medicine, horse medicine, diet, crafts, and folklore.

Henshaw, H. W., and C. Thomas
1907 Bannock. *Bureau of American Ethnology, Bulletin* 30(1):129-130.

This brief description of the Salmon River Bannock indicates that they had been forced west of the Rockies by the Blackfoot.

Herbort, Dale P.
1981 *Palmer Chert Quarry: An Examination of the Chert's Characteristics, Mechanics and Prehistoric Procurement*. Report by Mineral Research Center for Maronick Construction Company, East Helena.

Site 24JF266 is described. Quantitative testing results are included. The use of fire and water dousing used to fracture in situ blocks of material for removal is documented.

Hester, Thomas R., and Robert F. Heizer
1973 Review and Discussion of Great Basin Projectile Points: Forms and Chronology. *Contributions of Archaeological Research Facility*, University of California, Berkeley.

Comparison of point types for the Great Basin.

Hester, Thomas R., Alan D. Albee, and Cristy Willer
1977 Lithic Analysis of a Controlled Surface Collection From a Site in Western Montana. *Plains Anthropologist* 22(77):239-249.

Site 24PW320 was described and divided into different activities on the basis of lithic analysis. Ground stone as well as chipped stone tools are present at the site.

Historical Research Associates (HRA)
1981 *Cultural Resource Inventory Pamburn Unit Well No. 1 Wexpro Company, Teton County, Montana*. Report on file Butte District, Bureau of Land Management.

Brief survey report for well pad project.

Historical Research Associates (HRA)
1983 *Sun River (24CA74): A Stratified Pelican Lake and Oxbow Occupation Site near Great Falls, Montana*. Report prepared by HRA for Department of the Army, Omaha District, Corps of Engineers, Omaha, Nebraska.

This report documents the first dated occurrence of Oxbow components in Montana. Furthermore, it contains valuable appendices on soil and landform development, palynological studies, phytolith analysis, and flotation analysis.

Hoffman, J. J.
1953 Comments on the Use and Distribution of Tipi Rings in Montana, North Dakota, South Dakota, and Wyoming. *Anthropology and Sociology Papers* No. 14. Montana State University, Missoula.

This is one of the earliest compilations about the spatial distribution of stone ring sites.

Hoffman, J. J.
1969 Intermountain Pottery on Yellowstone Lake. *Archaeology in Montana* 2(34):3-7.

Describes "Shoshonean" pottery found at 48YE449.

Hoffman, Robert S., and Donald L. Pattie

1968 *A Guide to Montana Mammals: Identification, Habitat, Distribution and Abundance*. University of Montana, Missoula.

The title is a good description of contents. This is the primary guide to mammals of Montana.

Hogan, Bonnie H.

1969 *Two High Altitude Game Trap Sites in Montana*. Unpublished M.A. thesis, University of Montana, Missoula.

Sites 2410SE2 and 24ME555 are the subject of this thesis. Detailed historical and ethnographic references were used to illustrate the possibility of use of these types of game traps by both Plateau and Shoshone groups. 2410SE2 was most likely used repeatedly from 3,400 B.C. to A.D. 1,700 to trap deer. 24ME555 probably dates around A.D. 1,000 and was used to take mountain sheep.

1977 An Aboriginal Burial Site Near Kalispel. *Archaeology in Montana* 18(1):1-27.

The flexed burial of a single individual seemingly wrapped in a mat and accompanied by grave goods, including tubular pipe fragments, seed and bone beads, red ochre, *Olivella* and *Dentalium* shells, and so on, is described. It is hypothesized as Late Prehistoric in origin.

Holmes, William

1914 Areas of American Culture Characterization Tentatively Outlined as an Aid in the Study of the Antiquities. *American Anthropologist* 16(3):413-436.

This geographic classification of the cultures of North America is based primarily on pottery types, and the Butte District was put in region V—Great Plains-Rocky Mountains.

Horse Capture, George (editor)

1980 *The Seven Visions of Bull Lodge*. Bear Claw Press, Ann Arbor, Michigan.

Life history of a major Atsina man. Useful in this context due to its description of values involved in siting decisions and detailed recording of seasonal movements.

Howard, Elaine

1983 *Class III Inventory for West Line Replacement/South*. Report by Montana Power Company. On file at Butte District, Bureau of Land Management.

Survey report for powerline project.

Hughes, Jack T.

1948 *Supplementary Appraisal of the Archaeological and Paleontological Resources of the Tiber Reservoir, Toole and Liberty Counties, Montana*. Smithsonian Institution River Basin Project Appraisal. On file, Midwest Archeological Center, National Park Service, Lincoln, Nebraska.

Contains a series of brief site descriptions, but no analysis.

Huscher, B. H., and H. A. Huscher

1942 Athabaskan Migration Via the Intermontane Region. *American Antiquity* 8:80-88.

This article is representative of the archeological search for origins based on the distribution of forms.

Hultkrantz, Ake

1974 *The Shoshones in the Rocky Mountain Area*. Indian Land Claims 1951. Docket Nos. 326, 366, 367. Pet Ex. No. 389. (Also available in *Annals of Wyoming* 33(1):19-41, 1957)

This source emphasizes the subsistence strategy followed by Shoshonean groups.

Jasmann, Alice O. (Dede)

1962 Seven Pictograph Sites in Southwestern Montana. *Archaeology in Montana* 3:2.

This article describes seven sites on the Madison and Jefferson River drainages. One alignment and a stone ring are mentioned in passing.

1963 Folsom and Clovis Projectile Points Found in Southwestern Montana. *Archaeology in Montana* 5(3):10-18.

This article describes and illustrates several surface finds of Paleoindian materials within the Butte District.

Jenness, Diamond

1960 (1932) The Indians of Canada. *National Museum of Canada. Bulletin 65, Anthropological Series* No. 15. Ottawa.

This volume contains one chapter, Tribes of the Cordillera, that is directly relevant to the Butte District. Jenness regards this Culture Area as marginal to the Plains and Northwest Coast.

Jenni, Don

1962 Camas Creek (24SA5). *Archaeology in Montana* 4(4):9-20.

Artifacts illustrated indicate that this site is multi-component and that basalt and cryptocrystalline materials were used in all periods.

Jenni, Donald, and Sandy Jenni

1959 Camas Creek (24SA5). *Archaeology in Montana* 1(4):6-7.

Three Middle period points of cryptocrystalline materials are described from a surface locality on the Flathead Reservation.

1960 A Ranger Basin Campsite. *Archaeology in Montana* 2(1):2.

Describes a Late period obsidian point from a locality near Ennis.

1962 Camp Misery Site. *Archaeology in Montana* 3(4):6.

A single projectile point found at a spring in the Swan Range at 7,500 ft elevation is described.

Jochim, Michael A.

1979 Catches and Caches: Ethnographic Alternatives for Prehistory. In *Ethnoarchaeology*, edited by Carol Kramer, pp. 217-246. Columbia University Press, New York.

Outlines four factors that affect settlement size: degree of resource clustering, size of catchement area, variety of economic activities, and necessity for cooperative labor.

Johnson, Ann M.

1982 Extended Coalescent Pottery at the Horse Butte Site, West-Central Montana. *Archaeology in Montana* 23(1):1-9.

Reports and describes a rim sherd with handle found at a tipi ring site (24ME1001) in Meagher County. The sherd was identified as Extended Coalescent in style, thus suggesting contact between central South Dakota and west-central Montana.

Johnston, Alex

1969 Man's Utilization of the Flora of the Northwest Plains. In *Post-Pleistocene Man and His Environment on the Northern Plains*, edited by R. G. Forbis et al., pp. 108-176. University of Calgary Archaeological Association.

Is a secondary ethnobotany reference particularly pertinent to Blackfoot plant utilization of plants for food, medicine, and so on. Draws together a number of primary sources and updates scientific nomenclature.

Kaye, Barry, and D. W. Moodie

1978 The *Psoralea* Food Resource of the Northern Plains. *Plains Anthropologist* 23(82):329-336.

Kaye and Moodie present an argument against *P. esculenta* being an economically significant resource in the Plains.

Kehoe, Alice B.

1981 Revisionist Anthropology: Aboriginal North America with *CA* comment. *Current Anthropology* 22(5):503-518.

Kehoe's thesis is that American Indians had developed sets of adaptations to different regional environments and each society was as evolved as any other.

Kehoe, Thomas F.

1954 Stone 'Medicine Wheels' in Southern Alberta and the Adjacent Portion of Montana: Were They Designed As Grave Markers? *Journal of the Washington Academy of Sciences* 44(5):133-137.

Spokes radiating away from a central cairn are interpreted by the Blackfoot as being grave markers for important chiefs.

1960 Stone Tipi Rings in North-Central Montana and the Adjacent Portion of Alberta, Canada: Their Historical, Ethnological, and Archaeological Aspects. *Smithsonian Institution Bureau of American Ethnology, Bulletin* 173(62):417-474.

This work is a basic source on habitation structures and their material remnants as used by the Blackfoot.

1967 The Boarding School Bison Drive Site. *Plains Anthropologist, Memoir* No. 4.

This report describes a bison kill site in northwestern Montana. It usefully combines ethnographic and archeological data. Kehoe has subsequently been taken to task for associating particular projectile point types with Mississippian and Late Woodland traditions.

Kelly, Robert L.

1983 Hunter-Gatherer Mobility Strategies. *Journal of Anthropological Research* 39(3):277-306.

Kelly presents a model of mobility strategies used by hunters and gatherers. He relates resource structure, measured by precipitation and effective temperature, to mobility strategies. His model is difficult to apply to the study area since his measures of resource accessibility include dispersion, size, location, and processing costs, *but not* topography. Further, all of his ethnographic examples are drawn from the Post-horse period which certainly affects his measures of location and monitoring costs.

Keyser, James D.

n.d. *Archaeological Survey of BLM Land Near Helena, Montana.* Report by University of Montana Statewide Archaeological Survey. On file Butte District, Bureau of Land Management.

Survey report for area near Helena.

1974 The La Marche Game Trap: An Early Historic Game Trap in Southwestern Montana. *Plains Anthropologist* 19(65):173-179.

Site 24BE1011, a stylized, high-altitude game trap in the Beaverhead National Forest, is described. Keyser attributes the site to the Shoshone and indicates that the trap could have been used either for mountain sheep or deer.

Keyser, James D., and George C. Knight

1976 The Risley Bison Kill: West-Central Montana. *Plains Anthropologist* 21(74):291-300.

Site 24LC1003, a bison kill and butchering site situated on the floodplain of the Sun River approximately 4.5 miles north of Augusta, Montana is described. Plains side-notched points date the site to the Late period.

Kidwell, Arthur Spalding

1968 *The Conical Timbered Lodge on the Northwest Plains: Historical, Ethnological, and Archaeological Evidence.* M.A. thesis, University of Oregon, Eugene.

This work summarizes the distribution, types, and functions of timbered lodges in the Northwestern Plains.

Kimball, Patricia Culp

1976 Warm Creek Spring: A Prehistoric Lithic Workshop. *Archaeological Reports* No. 8. Idaho State University Museum of Natural History, Pocatello.

The Warm Creek Spring locality is an ignimbrite quarry. Introductory chapters provide a good summary of previous research in the area and on quarries in general. The major activity documented at the site was the production of ignimbrite biface blanks. Intermittent use of and occupation of the quarry locality is documented from 1,000 B.C. to A.D. 1,300. A most significant conclusion of this study is that exploitation of a particular potential quarry locale is as much a function of its central location with respect to other resources as it is a function of the quality of the raw material itself.

Kingsbury, Lawrence A.

1977 Final Report on 1976 Cultural Resource Inventory of the Little Lost River-Birch Creek Planning Unit. *Archaeological Reports* No. 10. Idaho State Museum of Natural History, Pocatello, Idaho.

Description of survey project and results for area in western Idaho.

Kissell, Mary L.

1909 A Kutenai Berry Basket. *American Anthropologist* 11:529-531.

Kutenai baskets were usually made of cedar root woven into an imbricated pattern and coated with pine pitch.

Knudson, Ruthann

1983 Organizational Variability in Late Paleo-Indian Assemblages. *Washington State University Laboratory of Anthropology, Reports of Investigations* No. 60.

This work provides a detailed examination of lithics from the MacHaffie site (24JF4). Lithic workers at MacHaffie made large bifacial cores, some thinning flakes, and a few deliberate blades, but apparently focused on cores as implement blanks.

Koch, Elers

1941 Big Game in Montana From Early Historical Records. *The Journal of Wildlife Management* 5(4):357-370.

Describes the types of game mentioned in journals and accounts of early trappers, explorers, and military campaigns in Montana. Is useful in documenting some early game distributions before extirpation or range restrictions.

Kraenzel, Carl Frederick

1955 *The Great Plains in Transition*. University of Oklahoma Press, Norman.

Major account of patterns of historic settlement and lifeways in the Great Plains. Is pertinent to the prehistoric period and prairie portions of the Butte District in that it documents the normal range of weather conditions in the Plains.

Kroeber, Alfred L.

1902 The Arapaho. *Bulletin of the American Museum of Natural History* 18.

Limited information on non-perishable items of material culture.

1940 *Natural and Cultural Areas in North America*. University of California Press, Berkeley.

In this anthropological classic, the majority of the Butte District is labeled as part of the Plateau Culture Area which is essentially defined in terms of negatives or absence of traits.

Lahren, Larry

1967 Additional Pictograph Sites in Park County, Montana. *Archaeology in Montana* 8(2):14-15.

Sites 24PA335 and PA336 are described and illustrated.

1968 A Preliminary Report on the Myers-Hindman Site. *Archaeology in Montana* 9(2):18-22.

Presents a brief description of the status of work at the Myers-Hindman site, 24PA504, which indicated occupation from McKean through Old Women's phases.

1976 *The Myers-Hindman Site: An Exploratory Study of Human Occupation Patterns in the Upper Yellowstone Valley From 7000 B.C. to A.D. 1200.* Anthropologos Researches International Incorporated, Livingston, MT.

Lahren's dissertation is a crucial resource because the stratigraphy is relatively clearcut and multiple C-14 dates document the various phases present.

Lahren, Larry A., and R. Bonnichsen

1974 Bone Foreshafts From a Clovis Burial in Southwestern Montana. *Science* 186:147-150.

The Anzick site (near Wilsall, MT) is described. The burial contained parts of two ochre-covered subadults and over 100 stone and bone artifacts.

Lewis, Oscar

1942 The Effects of White Contact Upon Blackfoot Culture, With Special Reference to the Fur Trade. *Monographs of the American Ethnological Society* 6. University of Washington Press, Seattle.

Contains scattered but significant information about habitation structures and settlement patterns.

Lewis, Henry T.

1978 Traditional Uses of Fire By Indians in Northern Alberta. *Current Anthropology* 19:401-402.

Documents the controlled use of fire in the Canadian Plateau.

Loendorf, Lawrence L.

1970 Prehistoric Patterns of Campsite Selection in the Pryor Mountains, Montana. *Archaeology in Montana* 11(1):17-44.

This article briefly presents Loendorf's seasonal transhumance model for the Pryor area.

1973 *Prehistoric Settlement Patterns in the Pryor Mountains*. Unpublished Ph.D. dissertation, University of Missouri, Columbia.

Loendorf proposes a seasonal round based on "transhumance." Autumn and winter sites are found in the conifer slopes or juniper breaks, as are the spring sites. Summer sites are located in the sub-alpine zone. This work provides one model of mountain/timber adaptation.

Leonhardy, Frank C., and David G. Rice

1970 A Proposed Culture Typology for the Lower Snake River Basin, Southeastern Washington. *Northwest Anthropological Research Notes* 4(1):1-29.

Presents a historical outline of culture change and artifact styles of the lower Snake River area.

Lowie, Robert H.

1909 The Northern Shoshone. *American Museum of Natural History* 2(2):169-306.

This work includes detailed descriptions of material culture and the subsistence cycle.

1942 Notes on Shoshonean Ethnography. *American Museum of Natural History* 20:3.

This work contains information about resource utilization and habitation structures. It also contains a long quotation from J. W. Powell on the Plateau Shoshonean technique for heat treating lithic materials.

1968 *The Crow Indians*. Holt, Rinehart and Winston, New York.

This work provides a basic summary of Lowie's many works on the Crow which was published originally in the *American Museum of Natural History* series.

Mack, Richard N.

1982 Pollen Analysis of Cores From Tepee Lake and McKillop Creek Pond, Lincoln County, Montana. In *Kootenai Canyon Archaeology: The 1979 LAURD Project Final Mitigation Report*, edited by Tom E. Roll, pp. 3.1-3.9. Report by Montana State University for the U.S. Army Corp of Engineers, Seattle District.

Describes the results of two pollen core studies in northwestern Montana. Both cores document climatic and vegetational shifts since the last glaciation.

Mack, Richard N., and John N. Thompson

1982 Evolution in Steppe With Few Large, Hooved Animals. *The American Naturalist* 119(6):757-771.

Describes differences between the dominant grass species of the Plateau and Plains grasslands and the relationship between the two grassland types and the grazing animals they support. Pertinent to the Butte District in that both grassland types are present and this has implications for grazing ungulate population levels.

Madsen, Brigham D.

1958 *The Bannack of Idaho*. Caxton, Caldwell, Idaho.

Limited usefulness for the Pre-horse period, but it relies heavily on Steward's work.

Malouf, Carling

1950 Notes on the Archaeology of the Big Hole Region, Montana. *Anthropology and Sociology Papers* No. 4. Montana State University, Missoula.

A stone ring site containing 13 rings (listed as 13 sites) on a terrace above the Big Hole River is described.

1957 *The Cultural Connections Between the Prehistoric Inhabitants of the Upper Missouri and Columbia River Systems*. ?Draft of Ph.D. dissertation, Columbia University, New York (not paginated). Ms. in Special Collections at Montana State University Library.

This source defines the "Montana Western Region," ties changes in lithic material type utilization to temporal periods, speculates about regional settlement patterns, and discusses pottery and steatite forms found in the area.

1960 Missouri River Headwaters Archaeology. A report of archeological investigations carried on by classes at Montana State College during summer sessions 1958 and 1960. Ms. sin Special Collections at Montana State University Library.

Describes the testing of 13 sites in the headwaters area. Explores the possibility of relating items of material culture to particular ethnic groups.

1961 A Short History of Montana Archaeology. *Archaeology in Montana* 3:2.

Traces the history of Montana archeology from the observations of Lewis and Clark until 1960.

1962a Pestles. *Archaeology in Montana* 4(4):3-7.

"Potato masher" type pestle is a late entry into the area from the Columbia Plateau.

1962b Pipes. *Archaeology in Montana* 5(1):4-10.

This article summarizes pipe types and the distribution of ethnographically known groups in western Montana.

1963 Battle Pits and War Lodges. *Archaeology in Montana* 5(2):1-11.

This article reviews the ethnographic and historical references for battle pits and war lodges and cautions that "eagle catching pits" may in fact be battle pits.

1966 Slate Knives or Scrapers. *Archaeology in Montana* 6(4):1-4.

This article describes how a Blackfoot manufactured a slate semi-lunar knife using direct and indirect percussion techniques. These tools were still being used as hide scrapers.

1969 The Coniferous Forests and Their Uses in the Northern Rocky Mountains Through 9,000 Years of Prehistory. In *Coniferous Forests of the Northern Rocky Mountains*, edited by Richard D. Taber, pp. 271-290. Center for Natural Resources, University of Montana Foundation, Missoula.

Describes several aspects of Native American lifeways in western Montana and discusses different forms of utilization of the area by modern populations.

1974 Economy and Land Use By the Indians of Western Montana, USA. In *Interior Salish and Eastern Washington Indians, II*, edited by S. A. Chalfant, C. Malouf, and M. G. Burlingame, pp. 117-178. Garland, New York.

This source lists botanical, faunal, and lithic resources, including in some cases in specific localities those utilized by prehistoric inhabitants of this area.

1975 Missouri River Headwaters Archaeology. *Archaeology in Montana* 16(1):1-42.

This article describes the work conducted two decades ago on the following sites: 24GA674, GA10, GA140, GA141, GA311 aka GA656—Antonsen site, GA301, GA314, GA141, GA652, GA106, GA304 aka 556—Madison tipi ring site, GA1231, and MA36. This article was prepared from the manuscript cited as Malouf (1960). This article is more easily accessible and has the added advantage of including the Smithsonian numbers.

1981 Salvage Archaeology and Its Application in Montana. *Anthropology Papers* No. 2. Department of Anthropology, University of Montana, Missoula.

This article traces the history of salvage archeology in Montana.

1982 A Study of the Prehistoric and Historic Sites Along the Lower Clark Fork River, Western Montana. *University of Montana Contributions to Anthropology* No. 7.

This report describes survey results from the 1950s. The following sites are described: 24SAl-24SA12.

Malouf, Carling, and Verne Dusenberry

1958? *Indian and Archaeology*. Ms. in special collections of Montana State University Library. Bozeman.

This manuscript was apparently prepared for the use of undergraduates undertaking research on Montana Indians. It includes an annotated bibliography prepared by V. Dusenberry.

McClintock, Walter

1910 *The Old North Trail or Life, Legends and Religion of the Blackfoot Indians*. MacMillan, New York.

This work is particularly important for its appendix which lists plant and animal resources utilized by the Blackfoot.

Marlow, C. B.

1981 *Human Days Use Based on Biscuitroot and Bitterroot Energy Content*. Ms. on file at Montana State University.

Caloric analyses of *Lomatium macrocarpa* and *Lewisia rediviva* are provided.

Martin, N., and D. Pyrah

1971 Sage Grouse. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 135-141. Montana Fish and Game Department, Helena.

Discusses sage grouse ecology, distribution, and management in Montana. Is pertinent to only the southern and eastern portions of the Butte District.

Masten, Ruth

1983 *A Cultural Resource Inspection of a Wire-Pulling Site on the Bonneville Power Administration's Townsend-Garrison Project*. Report by Archaeological and Historical Services, Eastern Washington University for Bonneville Power Administration. On file Butte District, Bureau of Land Management.

Survey report for a pipeline project.

May, Bruce, Bob Rainville, and Joe Huston

1979 *Trout Habitat Suitability Quantification Study*. Montana Department of Fish, Wildlife and Parks, Fisheries Division, Helena.

Describes an approach to studying trout habitat from stream attributes. Also provides trout densities and weights for several streams in northwestern Montana.

McLeod, Milo C.

1980 The Lolo Trail: A Significant Travel Route Across the Bitterroots. *Archaeology in Montana* 21(3):117-128.

Describes an effort to relocate the route of the original Lolo Trail. The Trail was used in both historic and prehistoric times and was the route followed by the Nez Perce who fled Idaho. The Trail was relocated on the ground by references to the Lewis and Clark map, scarred trees, and other on-the-ground physical features. The Trail often contains interbraided segments that formed a trail network.

Mehringer, Peter J., Stephan F. Arno, and Kenneth L. Peterson

1977 Postglacial History of Lost Trail Pass Bog, Bitterroot Mountains, Montana. *Arctic and Alpine Research* 9(4):345-368.

Describes climate and vegetational changes since the last glaciation, as demonstrated by pollen data from a bog in the Bitterroot Mountains. Good discussion and statistical analysis of pollen data and resulting interpretations including climate change, fire history, and use of volcanic ashes.

Meltzer, D. J.

1979 Paradigms and the Nature of Change in American Archaeology. *American Antiquity* 44:644-657.

The thesis of this article is that the change from the "old" archeology to the "new" archeology is in fact a change of method and not a change in paradigm. Both schools participate in the same world view, which might be best labeled as archeology as anthropology.

Mierendorf, R. R., C. Holstine, R. A. Masten, G. W. Lindeman, and T. K. Eller

1982 A Cultural Resources Survey and Site Testing of the Bonneville Power Administration's Townsend-Garrison Transmission Line, Powell, Jefferson, and Broadwater Counties, Montana. *Eastern Washington University Reports in Archaeology and History* 100-122.

The following prehistoric sites are described in this report: 24PW175-178, JF450, JF478, JF469, JF468, and JF467.

Miller, Carl F.

1963 Archaeological Manifestations in the Toole County Section of the Tiber Reservoir Basin, Montana. *Smithsonian Institution, Bureau of American Ethnology, Bulletin* 26(31):235-256.

Reports results of excavations at 24TL26, which was interpreted as a camp reused seasonally by bison hunters.

Miller, Jay

1982 People, Berdaches and Left-Handed Bears: Human Variation in Native America. *Journal of Anthropological Research* 38(3):274-287.

Structural analysis of culturally proscribed reversals of the norm. Contains limited information about the symbolic attributes of the tipi for the Kootenay.

Montana Magazine

1981 Montana Mountain Ranges. *Montana Geographic Series* No. 1. Montana Magazine, Helena.

Provides a brief description of the genesis, geology, ecology, and nature of the major mountain ranges of Montana. Is most valuable as a general comparison of different mountain systems.

Mooney, James

1892-1893 The Ghost-Dance Religion and the Sioux Outbreak of 1890. *Fourteenth Annual Report, Bureau of American Ethnology*, Part 2.

Documents the Kiowa presence at the junction of the Jefferson, Madison, and Gallatin Rivers, i.e., in the Missouri headwaters region in pre-1730s.

Mulloy, William T.

1958 A Preliminary Historical Outline for the Northwestern Plains. *University of Wyoming Publications in Science* 22(1).

This is a basic reference for the cultural chronology for the area.

Mueggler, W. F., and W. P. Handl

1974 *Mountain Grassland and Shrubland Habitat Types of Western Montana.* USDA Forest Service, Region 1, Missoula.

Provides a description and key for grass- and shrub-dominated habitat types and series of western Montana. Provides more raw data than synthesis, but includes usable information on constancy and canopy cover of subordinants, which include most edible taxa.

Murphy, Kerry, and Bart O'Gara

1982 Montana's Mysterious Cat. *Montana Outdoors* 13(3):1-4.

Popular account of the habits, habitat, and management of the mountain lion in western Montana.

Murray, Audrey L.

1974 Obsidian Quarries of the Centennial Valley of Southwestern Montana. Paper presented at the 1974 Plains Anthropological Conference. On file at Butte District, Bureau of Land Management.

Brief discussion of availability of ignimbrite in southwestern Montana.

Murray, Audrey L., J. D. Keyser, and F. W. Sharrock

1977 A Preliminary Shoreline Survey of Lima Reservoir: Archaeology in the Centennial Valley of Southwestern Montana. *Plains Anthropologist* 22(75):51-57.

This brief report documents the presence of obsidian (ignimbrite) quarries in the Centennial Valley. The authors also record cairn, stone ring, and lithic scatter sites and indicate that both Plains and Plateau point types were found in the valley.

Murphy, Robert F., and Yolanda Murphy

1960 Shoshone-Bannock Subsistence and Society. *University of California Anthropological Records* 6:293-338.

This work is an extremely detailed summary of ethnohistoric literature about the distribution and subsistence of the Shoshone.

Mussehl, T., P. Schladweiler, and R. Weckwerth

1971 Forest Grouse. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 143-151. Montana Fish and Game Department, Helena.

Discusses ecology, distribution, management, and harvest of blue grouse, ruffed grouse, and spruce grouse in Montana.

Napton, Lewis K.

1965 The Summit Survey. *Archaeology in Montana* 6(1):1-3.

Napton noted "Plateau" like artifacts and tipi rings in the Montana Western Region, but found mainly that most sites were small lithic scatters.

Napton, Lewis K.

1966 *Canyon and Valley: Preliminary Archaeological Survey in the Gallatin Area, Montana.* Unpublished M.A. thesis, University of Montana, Missoula.

This thesis presents an ecological model of site distribution in the Gallatin Valley area and also specific quantitative data regarding lithic distributions within the same area.

Narrol, Ralf

1962 Floor Area and Settlement Population. *American Antiquity* 27:587-589.

This brief article presents one method for estimating population size from archeological remains. It has been heavily criticized by Wissner (1974).

Newcomb, Thomas P.

1968 Some Fact and Much Conjecture Concerning the Sun River Medicine Wheel, Teton County, Montana. *Archaeology in Montana* 8(1):17-23.

The Sun River Medicine Wheel is described in detail. Other stone ring sites in the immediate area are mentioned.

O'Brien, L. Lynn

1973 *Montana Highway Salvage Progress Report September 29 Through November 20, 1972.* Manuscript prepared by the University of Montana and on file at the Bureau of Land Management, Butte District.

Brief description of highway salvage work.

1974a Report of the Reconnaissance Survey Phase of the Montana Highway Archaeological and Paleontological Salvage Program, 1971. *University of Montana Contributions to Anthropology* No. 4:1-34.

This report contains the following site descriptions relevant to the Butte District: 24M01002, M01003, JF1007, JF1006, MA1002, SB1001, MA1003, BE1007, BE1006, and BE1005.

1974b *Montana Highway Archaeological Reconnaissance Survey, 1973.* Report to the Montana Highway Commission. Ms. prepared by the University of Montana and on file at the Bureau of Land Management, Butte District.

Brief descriptive report of highway salvage work.

O'Hara, Blanche

1934 *A History of the Blackfeet Indians.* Unpublished M.A. thesis, State University of Montana.

Good chapter on dogs, but little reference to Pre-horse period.

Perry, Eugene S.

1962 Montana in the Geologic Past. *Montana Bureau of Mine and Geology Bulletin* 26. Butte.

Provides a general outline of geologic events and surface exposures throughout the State.

Petrides, George A.

1956 Big Game Densities and Range Carrying Capacities in East Africa. *Transactions of the 21st North American Wildlife Conference*, pp. 525-537.

Focuses on big game in Africa, but includes data from North American grasslands for comparison of densities. Is pertinent to the Butte District as a comparison of game densities in the prairie regions.

Phillips, Paul C.

1974 History of the Confederated Salish and Kootenai Tribes of the Flathead Reservation, Montana. In *Interior Salish and Eastern Washington Indians, III*, edited by D. H. Horr, pp. 233-305. Garland, New York.

This work deals only with the Post-horse period, but provides an excellent summary of ethnohistoric sources and excellent reprints of various historically significant maps.

Point, Father Nicholas

1967 *Wilderness Kingdom.* Edited by Joseph P. Donnelly. Holt, Rinehart and Winston, New York.

This reprint of the missionary's early journals provides detailed information on the Coeur D'Alene.

Powell, J. W.

1875 Exploration of the Colorado River of the West and its Tributaries, Explored in 1869-1872, Under the Direction of the Secretary of the Smithsonian Institution.

This work contains detailed information about Shoshonean material culture.

Rapoport, Amos

1982 *The Meaning of the Built Environment: A Nonverbal Communication Approach.* Sage, New York.

Proposes the hypothesis that topographic diversity or visual distinctiveness will frequently be used at the metaphorical level to carry meaning.

Ray, Verne F.

1933 The Sanpoil and Nespelem: Salishan Peoples of Northwestern Washington. *University of Washington, Publications in Anthropology* No. 5.

This ethnography is useful for its detailed treatment of material culture and its description of the seasonal round. These two groups were relatively isolated; they were never greatly affected by the introduction of the horse.

1939 Cultural Relations on the Plateau of Northwestern America. *Publications of the F. W. Hodge Anniversary Publication Fund*, Vol. 3. The Southwest Museum, Los Angeles, California.

This distributional study includes a chapter on material culture as well as a description of siting decisions related to burials.

1942 Cultural Element Distributions: XXII Plateau. *Anthropological Records* 8:2.

This work is a long trait list of material and non-material cultural items for Plateau groups.

Reeves, Brian O. K.

1969 The Southern Alberta Paleo-Cultural/Paleo-Environmental Sequence. In *Post-Pleistocene Man and His Environments on the Northern Plains*, edited by R. G. Forbis et al., pp. 6-46. University of Calgary Archaeological Association.

Describes geomorphic, palynological, and archeological data to document climatic environmental and cultural change since the last glaciation. Is generally applicable to the Butte District, but includes mostly data from Alberta.

1970 *Culture Change in the Northern Plains: 1000 B.C.-A.D. 1000.* Unpublished Ph.D. dissertation, Department of Archaeology, University of Calgary, Alberta.

Contains initial explication of prehistoric chronology and typology for the last half of the prehistoric sequence for the Northwestern Plains in general and Alberta in particular.

1973 The Concept of an Altithermal Cultural Hiatus in Northern Plains Prehistory. *American Anthropologist* 75:1221-1253.

Discusses validity of the idea that of the Plains were abandoned during the Altithermal.

1978 Bison Killing in the Southwestern Alberta Rockies. *Plains Anthropologist, Memoir* 14 (23-82 pt. 2):63-78.

Reeves describes a type of bison kill which represents single or repeated events in which small herds of bison (20-40 individuals) were trapped by hunters who utilized natural features and/or artificial aids in a mountain valley ecosystem.

1983 Six Millenniums of Buffalo Kills. *Scientific American* (October):120-135.

Provides a summary and interpretation of the Head Smashed-In site, including postulated variations in the types of imported lithic materials by phase.

Reher, Charles A.

1977 Adaptive Process on the Shortgrass Plains. In *For Theory Building in Archaeology*, edited by Lewis R. Binford, pp. 13-40. Academic Press, New York.

Describes subsistence and settlement patterns as seen at the Vore site in northern Wyoming. Is pertinent to the Butte District and all of the Northwestern Plains in terms of the discussion of the minor but critical aspects of climate and the short-term subsistence tactics within a long-term strategy.

Reid, Kenneth C.

1977 *Psoralea esculenta* As a Prairie Resource: An Ethnographic Appraisal. *Plains Anthropologist* 22:321-327.

Reed presents the case or hypothesis for examining the possibility that *P. esculenta* may have been an economically significant vegetal resource in the Plains.

1979 Getting to the Root of the Problem: A Rejoinder to Kaye and Moodie. *Plains Anthropologist* 24:339-340.

The thesis of this article is that there is no necessary relationship between the percentage of forbs surviving in contemporary remnant prairies and their distribution, abundance, or economic significance in the nineteenth century.

Rhodes, R. E.

1978 Archaeological Use and Abuse of Ecological Concepts and Studies: The Ecotone Example. *American Antiquity* 43:608-614.

The thesis of this article is that anthropologists need to be more sophisticated in their application of ecological models to site distribution problems.

Richmond, Gerald M.

1965 Glaciation of the Rocky Mountains. In *The Quaternary of the United States*, edited by H. E. Wright and D. G. Frey, pp. 217-230. Princeton University Press, Princeton, New Jersey.

Describes the various stages of glaciation and interglacial periods for the Northern Rocky Mountain Region since the Wisconsin glaciation.

Rideout, Chester B.

1978 Mountain Goat. In *Big Game of North America, Ecology and Management*, edited by John L. Schmidt and Douglas L. Gilbert, pp. 149-159. Stackpole Books, Harrisburg, Pennsylvania.

Discusses habits, habitat, distribution, and management of mountain goats in North America. Presents details of a study of habits and home range in the Sapphire Range of Montana.

Roll, Tom E.

1978 Tiber Reservoir, Montana: 1974 Archaeological Survey. *Archaeology in Montana* 19(1&2):59-130.

This article summarizes survey and testing results available for 123 sites in the immediate area of the Tiber Reservoir. Site contents, ownership, size, elevation, topographic location, and cultural affiliation are noted. 24TL1241, which is on BLM land, is included in the report.

1979 Additional Archaeological Assessment of the Fisher River Site (24LN10), Northwestern Montana. *Archaeology in Montana* 10(2):79-106.

Occupation at this site began before 1,000 B.C. and continued intermittently until the historic era. An appendix with excellent quality photographs of the recovered artifacts is included in the article.

Roll, Tom E. (editor)

1982 *Kootenai Canyon Archaeology: The 1979 LAURD Project Final Mitigation Report*. Report by Montana State University to U.S. Army Corps of Engineers, Seattle District.

Description and analysis of mitigation of several sites in the Kootenai River Valley. Concludes that the Barrier Falls Subarea of the Plateau Culture Area occupies a unique environmental setting and that prehistoric adaptations are characterized by the absence of many typical Plateau resources.

Roll, Tom E., and Ken Deaver

1980 The Bootlegger Trail Site, a Large Prehistoric Spring Bison Kill. *IAS Investigation Reports* 1. Washington, D.C.

Describes excavation and analysis of a spring bison kill on Tiber Reservoir. Is pertinent to the Butte District in that similar sites are common to the northeastern portion of the District.

Roll, Tom E., and Craig Henry

1982 Toward a Model of Prehistoric Subsistence in the Canyon Locality of the Kootenai River Region. In *Kootenai Canyon Archaeology the 1979 LAURD Project Final Mitigation Report*, edited by Tom E. Roll, pp. 4.1-4.21. Report by Montana State University for the U.S. Army Corps of Engineers, Seattle District.

Presents a model of resource distribution and density in the Kootenai Canyon Area and documents the lack of typical Plateau resources. The use of deer during winter valley concentration is the most effective subsistence strategy.

Roll, Tom E., and Marc B. Smith (editors)

1982 *Libby Additional Units and Reregulating Dam Cultural Resources Project 1979: Descriptive Archaeology*. Montana State University, Bozeman.

This volume describes the results of excavations at 24LN10, LN528, LN1020, LN1029, LN1124, and LN1125.

Ross, Clyde P., David A. Andrews, and Irving J. Witkind

1958 *Geologic Map of Montana*. U.S. Geological Survey, Washington, D.C.

Is a map of surface geologic strata for the entire State of Montana. Each formation or complex is described briefly. Major value lies in the opportunity to trace the distribution of geologic types or units across large areas.

Ross, Robert L., and Harold E. Hunter

1976 *Climax Vegetation of Montana Based on Soils and Climate*. Soil Conservation Service, Bozeman, Montana.

Describes potential vegetation types for all general locations in Montana. Is less rigorous and systematic than other synecological sources, but it covers a larger area and is valuable for large-scale distribution comparisons. Also presents precipitation data.

Scarborough, Vern

1975 *Archaeological Survey in the Jefferson Planning Unit of Jefferson, County, Southwestern Montana*. WICHE Report on file Butte District, Bureau of Land Management.

Survey report of a small sample of BLM land in Jefferson County.

Schaeffer, Claude E.

1934-5(?) An Acculturation Study of the Indians of the Flathead Reservation of Western Arizona (sic). Ms. submitted to the Commissioner of Indian Affairs.

This manuscript includes an extensive discussion of lifeways in the Pre-horse period.

1934 *Fieldwork Among Flathead Indians*, Montana. Ms. on file at the Alberta-Glenbow Museum, Calgary. I & II.

This file contains transcripts of field notes. Informants' names are noted.

1935a Fieldnotes. Vol. 2. (Title page also notes Anthropology Archives, W.P.A. Project, Henrietta Jones—1936). Ms. on file in Alberta-Glenbow Museum, Calgary.

This file contains transcripts of field notes. Dates of interviews and the informants' names are noted.

1935b Flathead (Selic) Medicine Ceremony. (Notes secured winter of 1935 at Flathead Reservation, Montana.) Ms. on file at Alberta-Glenbow Museum, Calgary.

Many of these field notes were incorporated in Schaeffer (1934-35).

1952 Molded Pottery Among the Kutenai Indians. *Anthropology and Sociology Papers* No. 6. Montana State University, Missoula.

Sanpoil, Kutenai, and Blackfoot make molded pottery. A Kutenai description of pit firing is presented.

1966 LeBlanc and LaGasse Predecessors of David Thompson in the Columbia Plateau. *Studies in Plains Anthropology and History* No. 3. (USDI—Indian Arts and Crafts Board, Museum of the Plains Indian, Browning).

LeBlanc and LaGasse were two French-Canadian trappers sent by Thompson to the Kutenai.

Schroedl, Gerald F.

1973 The Archaeological Occurrence of Bison in the Southern Plateau. *Reports of Investigations* No. 51. Laboratory of Anthropology, Washington State University, Pullman.

Bison on the Plateau in post-Altithermal times were integrated into existing patterns of resource utilization.

Schultz, G. E.

1974 A Description of the North Missoula Skeleton (24M01004). *University of Montana Contributions To Anthropology* No. 4:122-139.

The skeleton may be prehistoric or historic Chinese.

Schultz, James W.

1907 *My Life As An Indian*. Riverside Press, New York.

Romanticized account of the Blackfoot at the turn of the century. It does include specific data on aboriginal place names which occasionally gives clues to subsistence.

Sharrock, F. W., and J. D. Keyser 1975 Montana Highway Archaeological Salvage Testing Program, 1973 Report to the Montana Highway Commission. *University of Montana Contributions to Anthropology* No. 5:117-204.

The following sites are described in this report: 24TT1001-TT1012, LC1002, LC1003, LC1007, LC1001, SB1004, SB1006, SD1011, MA2030, MA2031, and MA1032. This report also provides a brief discussion of tipi rings in non-prairie contexts.

Science Applications Inc.

1981 *Cultural Resources Inventory—Pondera County—Tesoro Petroleum Corporation—722-1, 723-1, 827-1*. Report on file Butte District, Bureau of Land Management.

Brief survey reports for oil-related project.

Shimkin, Demitri Boris

1947 Wind River Shoshone Ethnogeography. *Anthropological Records* 5(4):245-284. University of California Press, Berkeley and Los Angeles.

Emphasis on Wyoming Shoshone Post-horse utilization of geographically distributed resources.

Shumate, Maynard

1950 The Archaeology of the Vicinity of Great Falls, Montana. *Anthropology and Sociology Papers* No. 2. Montana State University, Missoula.

Shumate records stone ring sites, lithic scatters, bison kills, alignments, projectile points (from all time periods), pipe fragments, and ground stone tools from a variety of unnumbered sites.

1958-59 Projectile Points From the Surface Near Great Falls. *Archaeology in Montana* 1(3):3-4.

A Scottsbluff and a Hanna point are described.

1962 Some Surface Finds Near Great Falls, Montana. *Archaeology in Montana* 4(4):7-8.

Multiple points are illustrated and described.

1967 The Carter Ferry Buffalo Kill. *Archaeology in Montana* 8(2):1-10.

The article describes a buffalo kill/pound site. The site is a single-component Middle period (Pelican Lake) impoundment. Obsidian hydration dates place the site between 3,000-2,000 B.P.

1972 Surface Collection From the Archie Johnson Site (24CA1004). *Archaeology in Montana* 13(1):39.

24CA1004 is six miles south of Great Falls and is a multi-component lithic scatter.

1974 Atlatl Weights From the Missouri Valley in West-Central Montana. *Archaeology in Montana* 15(3):55-58.

Describes three atlatl weights found in two localities east of Cascade and west of Ulm. Materials used were pipestone, sandstone, and soapstone. One example has carved decoration. Speculations are advanced as to the purpose and uses of type other than or in addition to being atlatl weights.

1975 Early Cultures at the Colemans Ridge Site Near Cascade, Montana. *Archaeology in Montana* 16(3):117-120.

Describes three Paleo points found on a ridge east of Cascade. Associated material is limited, but the points suggest occupation in Hell Gap and Late Paleo times.

1976 Two Former Besant Pounds Along the Sun River. *Archaeology in Montana* 17(1&2):11-31.

Describes two bison kills on the south terrace of the Sun River, west of Great Falls in Cascade County. Both sites were destroyed by contruction. The Dago Hill site seems to be Pelican Lake and/or Besant. The Stelling site is largely Besant, but with some anomalous point types. Variation in Besant point types is discussed.

1982 The Archaeology of Post-Glacial Lake Great Falls. *Archaeology in Montana* 23(3):1-39.

Documents occupation of Missouri River valley between Cascade and Great Falls from Clovis through Protohistoric periods. All material collected from surface in blow-outs. Three macro-stratigraphic units proposed: (1) gray blowsand of immediate post-glacial age to the Altithermal and containing all Paleoindian material; (2) Zone 1 brown sand containing Oxbow through Avonlea components and containing Old Women's and Protohistoric components. Pelican Lake material is very common in the area, while Bitterroot points are not mentioned.

Simon, Arleyn

1979 Pottery Manufacture Analysis: Experimental Assessment of Technological Continuity in the Altamont Region. *Archaeology in Montana* 20(2):1-78.

This is the only source on manufacturing processes involved in producing various types of ceramics found in northwestern Montana. The ethnographic, archeological, and experimental data are well integrated. This is perhaps the most useful source on Montana ceramics.

Sims, Cort

1971 Edged Cobbles in the Pacific Northwest. *Tebiwa* 14(2):21-38.

Sims hypothesizes that edge-ground cobbles, characteristic of the Columbia Plateau, were used as hide preparers.

Smith, C. G., and G. E. Schultz

1974 Report of the Preliminary Examination Phase of the Montana Highway Archaeological and Paleontological Salvage Program, 1971. *University of Montana Contributions to Anthropology* No. 4:35-75.

This report contains descriptions of the following sites within the Butte District: 24BE1001, BE1007, BE1006, BE1005, MA1003, MA1002, M01003, M01002, CA1002, CA1003, and TL1002.

Smith, Marc B.

1981 Archaeological Investigations in the Deep Creek—French Creek Locality, Deer Lodge County, Montana. *Archaeology in Montana* 22(2):39-87.

Describes a survey of a 5,640 acre sample of a 55,000 acre property (Mt. Haggin Ranch) purchased by the Montana Department of Fish, Wildlife and Parks. A total of 46 sites reported (4 of them historic). Nineteen sites produced diagnostic points, mostly Bitterroot and McKean, but some Paleo, Late period, and Late Middle period. All points are typed using Northwestern Plains types despite the proximity of Basin and Plateau Culture Areas. Site distribution favors lower elevations, level areas, and terraces along streams or springs.

Sonderegger, John L. James D. Schofield, Richard B. Berg, and Matthew L. Mannick

1982 The Upper Centennial Valley, Beaverhead and Madison Counties, Montana. *Montana Bureau of Mines and Geology Memoir* 50. Butte.

Provides a detailed description of the geology of the Upper Madison River and upper Red Rock River area in the Centennial Valley. Is most pertinent in its discussion of the Pleistocene tuff flows which have exposures of workable ignimbrite.

Spinden, Herbert Joseph

1908 The Nez Perce Indians. *Memoirs, American Anthropological Association* 2:165-274.

This source contains detailed information reading material culture and resources utilized by the Nez Perce.

Steedman, Elsie Viault

1930 Ethnobotany of the Thompson Indians of British Columbia Based on Field Notes By James A. Teit. *Forty-fifth Annual Report, Bureau of American Ethnology*, pp. 441-522.

This article consists primarily of species lists and individual plants utilized by the Thompson for various purposes.

Stelfox, John C., and Richard D. Taber

1969 Big Game in the Northern Rocky Mountain Coniferous Forest. In *Coniferous Forests of the Northern Rocky Mountains*, edited by Richard D. Taber, pp. 197-222. Center for Natural Resources, University of Montana Foundation, Missoula.

Describes distribution and density of large mammals in coniferous forest areas. Seasonal and altitudinal movements are discussed, particularly in regard to winter range. Periods of game exploitation and management are described.

Steward, Julian H.

1934 *The Blackfoot*. USDI-NPS-Field Division of Education.

This source relies on McClintock and Wissler for plant food lists. The publication is oriented toward preparing museum displays.

1938 Basin-Plateau Aboriginal Sociopolitical Groups. *Bureau of American Ethnology Bulletin* 120.

This ethnographic classic provides data on the low population density of the study area, which is seen as directly related to the low density of food resources. Volume includes extensive botanical lists and also summarizes the early ethnohistoric literature.

Swanson, Earl H., Jr.

1966 Cultural Relations Between Two Plains. *Archaeology in Montana* 7(2):1-2.

The thesis of this article is that the Rocky Mountain area is not marginal to the Plains and Plateau, but rather is a core area that has been continuously occupied since food resources have always been available here, while at lower altitudes plant and animal distributions have been sharply discontinuous in Prehistoric times.

Swanson, Earl H., Jr.

1972 *Birch Creek: Human Ecology in the Cool Desert of the Northern Rocky Mountains 9,000 B.C. - A.D. 1850*. The Idaho State University Press, Pocatello.

Describes the archeological sequence in the Birch Creek region of southwestern Idaho, based on the seriation of projectile points. Swanson develops his argument for the in situ development of a regional adaptation on the basis of the Birch Creek excavations.

Tate, Marcia

1981-82 *Cultural Resource Management Report Sun River Federal 1-9, 1-10, Alternate 3*. Reports by Powers Elevation for Williams Exploration. On file Butte District, Bureau of Land Management.

Brief well pad and access road survey reports.

Taylor, Dee C.

1973 Archaeological Investigations in the Libby Reservoir Area, Northwestern Montana. *University of Montana Contributions to Anthropology* No. 3.

Sites 24LN5-10 and 24LN501-527 are briefly described. Only formal finished tools are illustrated or discussed.

Taylor, Dee C.

1975 Report of the Preliminary Site Examination Phase of the Montana Highway Archaeological and Paleontological Salvage Program, August-September, 1972. *University of Montana Contributions to Anthropology* No. 5:97-116.

Describes sites 24PW1070, GA1002, GA1003, and GA1004 in the Butte District.

Taylor, D. C., C. G. Smith, E. A. Hedges, and J. D. Keyser

1974 The Rattlesnake Burial (24M01071). *University of Montana Contributions To Anthropology* No. 4:80-109.

This article is purely descriptive.

Teit, James A.

1900 The Thompson Indians of British Columbia. *Memoirs of the American Museum of Natural History* 2(1):163-392.

This detailed account of the Thompson includes sections on stone, bone and wood working, house forms, and the subsistence cycle. Although the Thompson never lived in the study area, they lived in a similar environment and Teit's descriptions of the Middle Columbia Salish, Coeur D'Alene, and Flathead make constant reference to this work, i.e., these groups are described as using the same tools, houseforms, and so on as the Thompson.

1906 The Lillooet Indians. *Memoirs of the American Museum of Natural History* 4:193-300.

This work includes a discussion of material culture and the subsistence round of the Lillooet.

1927-28 The Salishan Tribes of the Western Plateaus. *Bureau of American Ethnology Annual Report* 45, pp. 23-396.

This work describes in detail housing structures, some particulars on tool types, outlines the seasonal round, and lists plant and animal resources utilized. Groups described include the Coeur D'Alene, Okanagon, and Flathead Group, which includes Flathead, Pend D'Orielle (Kalispel), Spokane, Semetuse, and Tunaxe.

Teymur, Necdet

1982 *Environmental Discourse.* ?uestion Press, London.

The thesis of this work is that what the designers design and the planners plan is not "environment," but rather is complex sets of objects and relations the physical existence as well as theoretical conception of which are socially determined.

Thomas, David H.

1972 A Computer Simulation Model of Great Basin Shoshonean Subsistence and Settlement Patterns. In *Models in Archaeology*, edited by D. L. Clarke, pp. 671-704. London.

This article illustrates the application of computer simulation modeling to subsistence and settlement patterns. Of particular significance is the emphasis on the predictability of resources for scheduling and siting decisions.

Thompson, Otto, and Susan Hand

1950 Archaeological Notes on the Madison and Jefferson Rivers. *Anthropology and Sociology Papers* No. 3. Montana State University, Missoula.

Twelve (unnumbered) sites are briefly described. They include a steatite quarry, two stone ring sites, two kills, burials, a rockshelter, a "buffalo trail," and three lithic scatters. An "incised gridded quartzite slab" is illustrated.

Thwaites, R. G. (editor)

1966a Part II of Maximilian, Prince of Wied's Travels in the Interior of North America, 1832-1834. In *Early Western Travels 1748-1846*, Vol. 23. AMS, New York.

Contains brief descriptions of Blackfoot life.

1966b DeSmet's Oregon Missions and Travels over the Rocky Mountains 1845-1846. In *Early Western Travels 1748-1846*, Vol. 29. AMS Press, New York.

This work contains brief descriptions of the Kutenai, Flathead, Kalispel, and Coeur D'Alene.

Trenholm, V. C., and M. Carly

1964 *The Shoshones: Sentinels of the Rockies*. University of Oklahoma Press, Norman.

This book is of limited usefulness in this context since it deals exclusively with the Post-horse period.

Trigger, Bruce G.

1980 Archaeology and Image of the American Indian. *American Antiquity* 45:662-676.

The thesis of this article is that archeologists have treated Native Americans as objects and generally in a negative fashion. Trigger calls for processual archeologists to look to history and ethnohistory as a corrective measure.

Tro, Roger P.

1967 The Material Culture of the Kutenai. *Archaeology in Montana* 8(4):1-11.

This source, relying mainly on Turney-High and Schaeffer, lists and describes items of Kutenai material culture that might be found in archeological sites.

Tro, Roger P., and Louise C. Tro

1968 The Devil's Eyebrow Site: A Preliminary Report. *Archaeology in Montana* 9(3):20-22.

Site 24GR111 is described. It is located two miles east of Hall, Montana.

Tro, Roger P., and Louise C. Tro

1968 The Lost Horse and Elbow Lake Occupation Sites. *Archaeology in Montana* 9(1):11-16.

Sites 24M0506 and M0507, located on the Clearwater River north of its confluence with the Blackfoot, are described. Quantitative lithic data indicate a disproportionate use of cryptocrystalline materials for finished patterned tools and retouched flakes, in comparison with basalt which numerically dominates the materials recovered.

Turner, Nancy J.

1978 Food Plants of British Columbia Peoples, Part 2/Interior Peoples. British Columbia Provincial Museum, Victoria, Canada (Handbook No. 36).

Standard reference on botanical resources. Includes botanical descriptions, habitat associations, and Indian usage, as well as pictures of each plant covered.

Turney-High, Harry H.

1937 The Flathead Indians of Montana. *American Anthropological Association Memoirs* 48:1-160.

This work contains very little about material culture. A brief description of house forms is presented and the subsistence cycle is described.

1941 Ethnography of the Kutenai. *American Anthropological Association Memoirs* No. 56.

A classic source on Kutenai ethnography. However, caution should be exercised in accepting Turney-High's interpretations about the Pre-horse period.

Tyrell, J. B. (editor)

1916 *David Thompson's Narrative of His explorations in Western America*. The Champlain Society, Toronto.

The journals contain brief references to Plateau and Plains groups relevant to the area. It is most useful for the Post-horse period in the northern part of the District.

United States Department of Commerce (USDC)

1980 *Climatological Data Annual Summary*. National Climatic Center, Ashville, North Carolina.

Provides raw weather data (temperature and precipitation) collected from all reporting stations in Montana for the year 1980 and long-term averages.

Vincent, William B.
1983 *Cultural Resource Survey of Portions of the Buffalo Hump Area, Park County, Montana*. Report by Cumin Associates for Seis Pros Inc. On file Butte District, Bureau of Land Management.

Survey report of a project in Park County.

Waddington, J. C. B., and H. E. Wright, Jr.
1974 Late Quaternary Vegetational Changes on the East Side of Yellowstone Park, Wyoming. *Quaternary Research* 4(2):175-184.

Describes climatic and vegetational changes of the Yellowstone Park area since the last glaciation.

Walcheck, Ken
1976 Montana Wildlife 170 Years Ago. *Montana Outdoors* 7(4):15-30.

Describes wildlife reported by the Lewis and Clark expedition as it passed through Montana. Valuable in that it notes the abundance of various taxa in the prairie regions and different types and densities in the mountainous portions of Montana.

Walker, Deward E., Jr.
1971 American Indians of Idaho. *Anthropological Monographs of the University of Idaho* No. 2. Moscow.

This volume reviews the subsistence and social organization of the Kutenai, Kalispel, Coeur D'Alene, Nez Perce, Shoshone-Bannock, and Northern Paiute.

Ward, Linda C.
1973 *Prehistory of the Bitterroot Valley*. Unpublished M.A. thesis, University of Montana, Missoula.

Nineteen sites, 18 in Ravalli County and one in Missoula County, are described. Pictographs are the predominant site type.

Weckwerth, R.
1971 Black Bear and Grizzly Bear. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 115-125. Montana Fish and Game Department, Helena.

Discusses bear ecology, habits, habitat, and present distribution in Montana. Briefly discusses management strategy.

Wedel, Waldo R.
1961 *Prehistoric Man on the Great Plains*. University of Oklahoma Press, Norman.

This is a basic reference for the cultural chronology for the area. It is one of the earlier systematic attempts to apply cultural ecology to the prehistory of the Plains.

Weisel, G. F.
1952 Animal Names, Anatomical Terms and Some Ethnozoology of the Flathead Indians. *Journal of the Washington Academy of Science* 42(11):345-355.

The article is an excellent compilation of faunal resources utilized by the Flathead.

Werner, Jewell R.
1981 Some Notes on Pictographs from the Jefferson River Headwaters. *Archaeology in Montana* 22(3):75-82.

Describes motifs present in several pictograph sites in southwestern Montana, along with common colors and speculations about means of application. Animals (deer, elk, mountain goat, and bison) are common along with human figures, hand silhouettes, plateau tally marks, horses, and a fish. Red is the most common color, then black and finally white. A deer rib at one site appears to be the means by which paint was applied to the rock.

White, Thain
n.d. Kutenai Pipes. *Western Anthropology* No. 1.

This article describes the localities of several pipe stone quarries within the boundaries of the Butte District, in addition to discussing the historical sequence of pipe types found among the Kutenai.

n.d. Kutenai Place Names of the Flathead Lake Region In Northwestern Montana. *Flathead Lake Lookout Museum* No. 11. Lakeside, Montana.

Useful because some of the locality names make explicit reference to subsistence activities.

1959 Tipi Rings in the Flathead Lake Area, Western Montana. *Anthropology and Sociology Papers* No. 19. Montana State University, Missoula.

Several stone ring sites, all apparently on an upland area above a seasonal drainage, are described. Forty-three is the largest number of stone rings reported at any one site.

Willey, Gordon R.

1966 *Introduction to North American Archaeology. Vol. 1: North and Middle America.* Prentice-Hall, Englewood Cliffs, New Jersey.

This standard archeological work provides an overview of North American archeology, which is useful in this context for the definition of archeological areas.

Willey, Gordon R., and Philip Phillips

1958 *Method and Theory in American Archaeology.* The University of Chicago Press.

This source was used in the context of this project strictly as a source for terminological reference.

Willey, Gordon R., and Jeremy A. Sabloff

1974 *A History of American Archaeology.* W. H. Freeman & Company, San Francisco.

Standard/basic reference regarding paradigmatic shifts in American archeology.

Wilmsen, Edwin N.

1973 Interaction, Spacing Behavior, and the Organization of Hunting Bands. *Journal of Anthropological Research* 29(1):1-31.

The thesis ot this article is that band size is related to the relative stability of resources exploited and that seasonal fluctuations of band size are a function of resource utilization strategies.

Wishart, William

1978 Bighorn Sheep. In *Big Game of North America, Ecology and Management*, edited by John L. Schmidt and Douglas L. Gilbert, pp. 161-171. Stackpole Books, Harrisburg, Pennsylvania.

Describes habits, habitat, distribution, management, and physical characteristics of bighorn sheep in North America. Generally pertinent to sheep in western Montana.

Wissler, Clark

1908 Ethnographic Problems of the Missouri Saskatchewan Area. *American Anthropologist* 10:197-207.

This summary of “current problems” reflects the diffusional orientation of the times.

1910 Material Culture of the Blackfoot Indians. *American Museum of Natural History* 5:1.

Contains detailed description of material culture, plant and animal utilization lists, limited descriptions of lithic forms, and habitation structures.

1911 The Social Life of the Blackfoot Indians. *American Museum of Natural History* 7:1.

Little archeological relevance, but it does describe the use of water-worn, egg-shaped pebbles as tops (children’s toys).

1912 The Ceremonial Bundles of the Blackfoot Indians. *American Museum of Natural History* 7:2.

Contains sacred plant use list, descriptions of fasting structures, and fetish items curated in bundles.

1913 Societies and Dance Associations of the Blackfoot Indians. *American Museum of Natural History* 11:4.

No archeologically relevant material.

1918 The Sun Dance of the Blackfoot Indians. *American Museum of Natural History* 16:3.

No archeologically relevant material.

Wissler, Clark, and D. C. Duvall

1908 Mythology of the Blackfoot Indians. *American Museum of Natural History* 2:1.

Documents the metaphorical significance of the white stone/rock knife. It also records the symbolic attributes of various topographic features as well as habitation structures.

Wissner, Polly

1974 A Functional Estimator of Population From Floor Area. *American Antiquity* 39:343-49.

Wissner presents a mathematical model for deriving population estimates based on regression formulae. Her method is based on data derived from modern hunters and gatherers.

Witt, D., and J. Salinas

1971 Waterfowl. In *Game Management in Montana*, edited by T. W. Mussehl and F. W. Howell, pp. 185-193. Montana Fish and Game Department, Helena.

Discusses the variety of waterfowl common to Montana and their seasonal distribution. Also discusses management approaches.

Wormington, H. M., and R. G. Forbis

1965 An Introduction to the Archaeology of Alberta. *Denver Museum of Natural History Proceedings* No. 11.

This basic work employs an almost exclusively Plains-oriented paradigm. The Appendix by J. B. Griffin, "Prehistoric Pottery from Southeastern Alberta," addresses the problem of pottery found in northern Montana which is associated by some workers with the Blackfoot or Kutenai.

Wright, Gary A., Susan Bender, and Stuart Reeve

1980 High Country Adaptations. *Plains Anthropologist* 25(89):181-197.

This article presents a model of a subsistence strategy where bighorn sheep became a critical resource in late summer and winter for Shoshonean groups.

Zeier, Charles D.

1975 *A Morphology—Use Analysis of Besant Phase Projectile Points: Antonsen Site (24GA660) Gallatin County, Montana.* Unpublished M.A. thesis, University of Nebraska.

Material type was found to be a significant intervening variable in both morphological type and use-wear patterns.

The following are limited distribution reports. Their contents, for the most part, are well summarized by their titles. All are part of the Archaeological Records at the University of Montana. Although the University of Montana maintains files for Forest Service reports, these must be accessed through the Forest Service, Regional Archaeologist's Office, Region 1, Missoula.

Anonymous
n.d. Cherry Creek Moss 24MA202 Artifact Notes, 2 pp.

Beyer, J.
1977 *Cultural Resources Inventory, Bear Trap Primitive Area.* Bureau of Land Management, 11 pp.

Conner, S.
n.d. *Robison Rockshelter Report.* Unpublished ms. on file.

Craighead, J.
1980 *1979 Archaeological Survey of Pine Butte.* Unpublished report to the Nature Conservancy. Removed.

Crouch, J.
1969 *Missoula District Bureau of Land Management Archaeological Survey.* Unpublished report on file, 57 pp.

Davis, L.
1973 *An Inventory and Impact Evaluation of Archaeological and Historical Resources Located on and Adjacent to Properties Near Hebgen Lake to be Developed by Ski Yellowstone Inc.: A Summary Report.* Report to Ski Yellowstone, Inc.

1978 Letter Report, Beartooth Recreation Management, 4 pp.

Earle, B. J.
n.d. *A Drive Alignment Along the South Shore of Clark Canyon Reservoir and Its Relationship to Sites in the Vicinity of 24BE1004.* Unpublished ms., 7 pp.

Flint, P.
1980 *Flint Creek Valley Archaeology Project.* Unpublished ms., 6 pp.

Frankowski, L.
1978a *Grant Kohrs Ranch National Historic Site Overview.* Midwest Archeological Center, 32 pp.

1978b *Big Hole National Battlefield Overview.* Midwest Archeological Center, 28 pp.

Fredlund, D.
n.d. *The Archaeological Significance of the Centennial Valley at Dillon, Montana.* Unpublished ms., 7 pp.

Gough, S., and J. Galm
1982 A Cultural Resources Survey and Test of the Bonneville Power Administrations's Macks Inn—West Yellowstone 115 KV Transmission Line, Freemont County, Idaho and Gallatin County, Montana. *Eastern Washington University Reports in Archaeology and History*, pp. 10q?121.

Greer, J.
1979 *Cultural Resource Inventory, Anadarko Federal No. 22-11.* Report Prepared For Diamond Shamrock Company (Pondera County), 5 pp.

Habermann, T., and A. Ramos
1974 *The Rice Site—24SB1005: A Surface Reconnaissance Report.* Unpublished ms., Statewide Archaeological Survey, 11 pp.

Hamilton, C.
1977 *Cultural Resources Inventory, Humburg Spires Primitive Area.* Unpublished ms., 8 pp.

Hilmo, G.
n.d. *The Rocky Fork of the Clark Fork.* Unpublished ms., 35 pp.

Howard, E.
1983 *Class III Inventory for West Line Replacement/South.* Report by Montana Power Company, 14 pp.

Jelk, R.
n.d. *Data on Archaeological Material From the Blackfoot River Area and Northwestern Montana.* Unpublished ms., 12 pp.

Jenni, D.
1960 *Upper Madison Valley Report.* Unpublished ms., 19 pp.

Keyser, J., A. Murray, and F. Sharrock
1974 *Historical and Archaeological Survey, Rock Creek Drainage.* Report to USDA Forest Service, 40 pp.

Lewis, H. P.
n.d. *Buffalo Kills of Montana.* Unpublished ms. (DL).

McDaniel, D.
n.d. *Missoula District's Segment of the Lewis and Clark Trail.* Unpublished ms., 13 pp.

Melton, D.
1981 Cultural Resource Inventory of Proposed D.A.S. Well Pad 1620—Federal and Access Road (Pondera County). Report to D.A.S. Resource Ventures Ltd., 4 pp.

Melton, D., and F. Munday
1982 *Preliminary Report on a Probable Bison (Bison) occidentalis Site in the Crazy Mountains, Montana.* Ms., 5 pp.

Melton, W.
n.d. *Late Pleistocene? Mammals and Artifacts Recovered from Blacktail Cave, Lewis and Clark County, Montana.* Ms. submitted to National Geographic Society, 14 pp.

Murray, A.
1975 *Results of Archival Research Involving the Old Boulder State Station.* Report prepared for USDA Soil Conservation Service, 12 pp.

Napton, L., and A. Carmichael
1964 *Archaeological Survey of the Upper Blackfoot Valley.* Unpublished ms.

Rominger, D.
1976 *An Archaeological Survey of the Helena National Forest.* Report to Forest Service, 100 pp.

Samuelson, A.
1983 *Cultural Resource Report on 24GA488, Hoell Land Exchange.* Bozeman Ranger District (D-6), Gallatin National Forest, 22 pp.

Scott, S.
1981 *Aunt Molly's Fishing Access Site.* Report prepared by Montana Historical Society for Department of Fish, Wildlife and Parks, 15 pp.

Sharrock, F., and J. Keyser

1974 *Montana Highway Archaeological Salvage Testing Program, 1973 Report to Montana Highway Commission*, 117 pp.

Smith, C.

1974 *Tabulation of Known Archaeological Sites Within the Powerline Study Area, Montana*. Report prepared for USDI, Bureau of Land Management, 295 pp.

1975 *Highway Salvage Archaeology Program, 1975 Season*. Report to the State of Montana Department of Highways, 10 pp.

1977 *Highway Salvage Program, 1977 Season*. Report to State of Montana Department of Highways, 49 pp.

Taylor, D., G. Carmichael, J. Taylor, and P. Steere

1979 *Cultural Resources Inventories, Montana Department of Highways, Federal Aid Project Numbers I-15-3(12)150, Bernice-Basin and I-IG15 15-3(29) 157, Basin-Boulder*, 42XX pp.

Western Interpretive Services

1974 *Historic Sites in the Colstrip To Hot Springs Transmission Line Study Area*. Report prepared for USDI, Bureau of Land Management, 169 pp.

Wood, G.

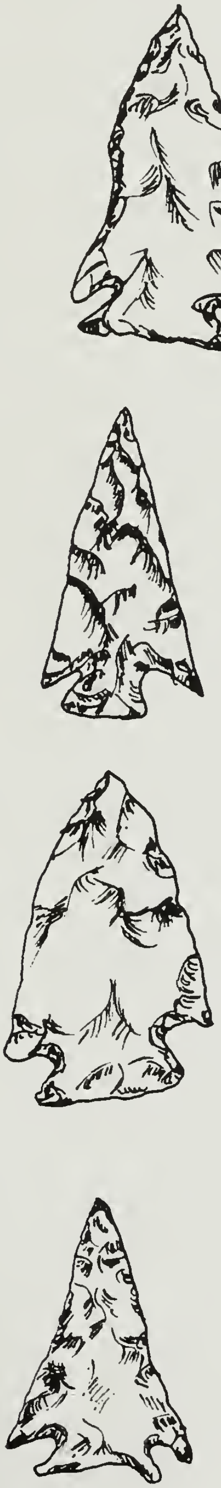
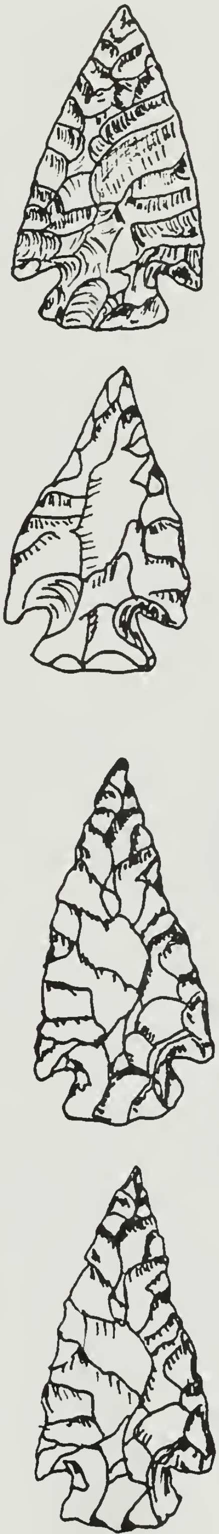
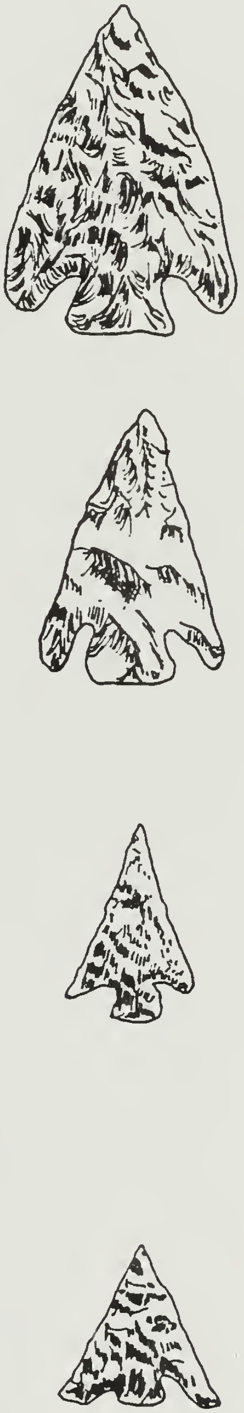
1983a *Federal 5-1 Superior, CRM Inventory (Teton County) Consultant's Report*, 3 pp.

1983b *Cultural Resources Inventory Energy Development, Celsius Energy Company*, No. 1-21 Federal, Teton County, 3 pp.

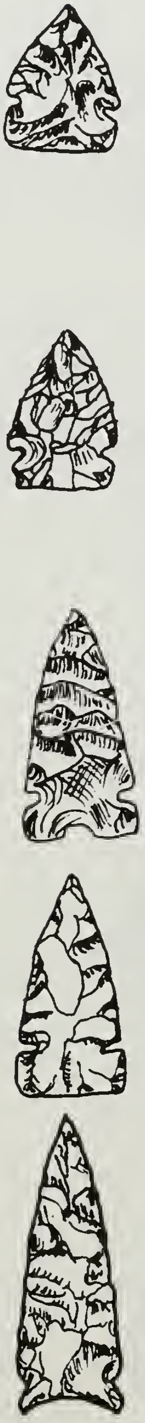
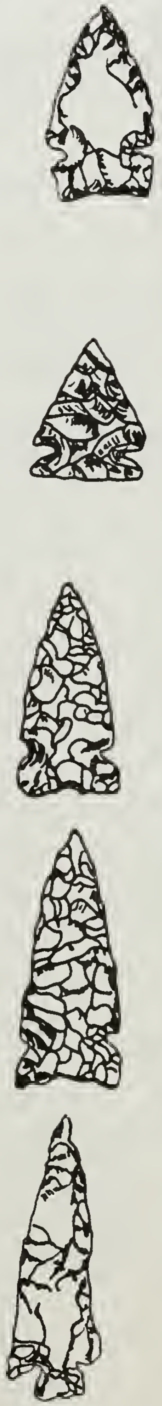
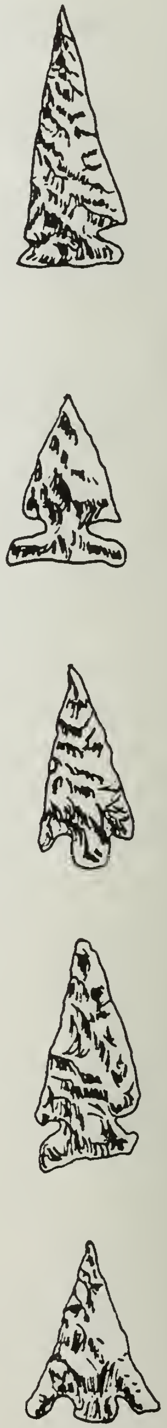
1983c *Cultural Resource Inventory Energy Development Federal 5-1 Superior, Teton County,* 3 pp.

Appendix IV. Selected Point Style Illustrations

Typical Plains, Basin, and Plateau Point Styles During the Late Archaic (Middle) Period and Late Prehistoric Period

Range of Variation During	Plains (Dyck 1983; Reeves 1970)	Basin (Hester and Heizer 1973)	Plateau (Leonhardy and Rice 1970)
	Pelican Lake	Elko Eared or Corner Notched	Harder
Late Archaic (Middle Period)			

Typical Plains, Basin, and Plateau Point Styles During the Late Archaic (Middle) Period and Late Prehistoric Period

Range of Variation During	Plains (Dyck 1983; Reeves 1970)	Basin (Hester and Heizer 1973)	Plateau (Leonhardy and Rice 1970)
	Avonlea Old Women's	Rose Springs CN Desert SN	Piqunin
Late Prehistoric Period			

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